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40 CFR Parts 53 and 58
Revisions to Ambient Air Monitoring Regulations; Proposed Rule

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 53 and 58

[EPA–HQ–OAR–2004–0018; FRL–8015–9]

RIN 2060–AJ25

Revisions to Ambient Air Monitoring Regulations

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule; amendments.

SUMMARY: The EPA is proposing to revise the ambient air monitoring requirements for criteria pollutants. This proposal establishes ambient air monitoring requirements in support of the proposed revisions to the National Ambient Air Quality Standards (NAAQS) for particulate matter published elsewhere in today's **Federal Register**, including new minimum monitoring network requirements for $PM_{10-2.5}$ and criteria for approval of Federal reference and equivalent methods for $PM_{10-2.5}$ (to supplement the Federal reference method for $PM_{10-2.5}$ proposed elsewhere in today's **Federal Register**). This proposal also requires each State to operate one to three monitoring stations that take an integrated, multipollutant approach to ambient air monitoring. The proposed amendments modify the requirements for ambient air monitors by focusing requirements on populated areas with air quality problems and significantly reducing the requirements for criteria pollutant monitors that have measured ambient air concentrations well below the applicable NAAQS. Other proposed amendments revise the requirements for reference and equivalent method determinations (including specifications and test procedures) for fine particulate monitors, monitoring network descriptions and periodic assessments, quality assurance, and data certification. The purpose of the proposed amendments is to enhance ambient air quality monitoring to better serve current and future air quality management and research needs.

DATES: Comments must be received on or before April 17, 2006.

ADDRESSES: Submit your comments, identified by Docket ID No. EPA–HQ–OAR–2004–0018, by one of the following methods:

- *http://www.regulations.gov:* Follow the on-line instructions for submitting comments.
- E-mail: *a-and-r-docket@epa.gov.*
- Fax: (202) 566–1741.
- Mail: Revisions to Ambient Air Monitoring Regulations, Docket No. EPA–HQ–OAR–2004–0018, Environmental Protection Agency, Mailcode 6102T, 1200 Pennsylvania Ave., NW., Washington, DC 20460. Please include a total of two copies. In addition, please mail a copy of your comments on the information collection provisions to the Office of Information and Regulatory Affairs, Office of Management and Budget (OMB), Attn: Desk Officer for EPA, 725 17th St., NW., Washington, DC 20503.
- Hand Delivery: EPA Docket Center, 1301 Constitution Avenue, NW., Room B102, Washington, DC 20460. Such deliveries are only accepted during the Docket's normal hours of operation, and special arrangements should be made for deliveries of boxed information.

Instructions: Direct your comments to Docket ID No. EPA–HQ–OAR–2004–0018. EPA's policy is that all comments received will be included in the public docket without change and may be made available online at *http://www.regulations.gov,* including any personal information provided, unless the comment includes information claimed to be Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Do not submit information that you consider to be CBI or otherwise protected through *http://www.regulations.gov* or e-mail. The *http://www.regulations.gov* Web site is an ''anonymous access'' system, which means EPA will not know your identity or contact information unless you provide it in the body of your comment. If you send an e-mail comment directly to EPA without going through *http://www.regulations.gov* your e-mail address will be automatically captured and included as part of the comment that is placed in the public docket and made available on the Internet. If you submit an electronic comment, EPA recommends that you include your name and other contact information in the body of your comment and with any disk or CD ROM you submit. If EPA cannot read your comment due to technical difficulties and cannot contact you for clarification, EPA may not be able to consider your comment. Electronic files should avoid the use of special characters, any form of encryption, and be free of any defects or viruses. For additional information about EPA's public docket, visit the EPA Docket Center homepage at *http://www.epa.gov/epahome/dockets.htm.*

Docket: All documents in the docket are listed in the *http://www.regulations.gov index.* Although listed in the index, some information is not publicly available, e.g., CBI or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, will be publicly available only in hard copy. Publicly available docket materials are available either electronically in *http://www.regulations.gov* or in hard copy at the Revisions to the Ambient Air Monitoring Regulations Docket, EPA/DC, EPA West, Room B102, 1301 Constitution Ave., NW., Washington, DC. The Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566–1744, and the telephone number for the Air Docket is (202) 566–1742.

FOR FURTHER INFORMATION CONTACT: For general questions concerning today's proposed amendments, please contact Mr. Lewis Weinstock, U.S. EPA, Office of Air Quality Planning and Standards, Emissions Monitoring and Analysis Division, Ambient Air Monitoring Group (D243–02), Research Triangle Park, North Carolina 27711; telephone number: (919) 541–3661; fax number: (919) 541–1903; e-mail address: *weinstock.lewis@epa.gov.* For technical questions, please contact Mr. Tim Hanley, U.S. EPA, Office of Air Quality Planning and Standards, Emissions Monitoring and Analysis Division, Ambient Air Monitoring Group (D243–02), Research Triangle Park, North Carolina 27711; telephone number: (919) 541–4417; fax number: (919) 541–1903; e-mail address: *hanley.tim@epa.gov.*

SUPPLEMENTARY INFORMATION:

I. General Information

A. Does This Action Apply to Me?

Categories and entities potentially regulated by this action include:

Category	NAIC code [1]	Examples of regulated entities
Industry	334513 541380	Manufacturer, supplier, distributor, or vendor of ambient air monitoring instruments; analytical laboratories or other monitoring organizations that elect to submit an application for a reference or equivalent method determination under 40 CFR part 53.

Category	NAIC code[1]	Examples of regulated entities
Federal government	924110	Federal agencies (that conduct ambient air monitoring similar to that conducted by States under 40 CFR part 58 and that wish EPA to use their monitoring data in the same manner as State data) or that elect to submit an application for a reference or equivalent method determination under 40 CFR part 53.
State/local/tribal government	924110	State, territorial, and local, air quality management programs that are responsible for ambient air monitoring under 40 CFR part 58 or that elect to submit an application for a reference or equivalent method determination under 40 CFR part 53. The proposal also may affect Tribes that conduct ambient air monitoring similar to that conducted by States and that wish EPA to use their monitoring data in the same manner as State monitoring data.

[1] North American Industry Classification System.

This table is not intended to be exhaustive, but rather provides a guide for readers regarding entities likely to be regulated by this action. To determine whether your facility or Federal, State, local, or territorial agency would be regulated by this action, you should examine the requirements for reference or equivalent method determinations in 40 CFR part 53, subpart A (General Provisions) and the applicability criteria in 40 CFR 51.1 of EPA's requirements for State implementation plans. If you have any questions regarding the applicability of this action to a particular entity, consult the person listed in the preceding **FOR FURTHER INFORMATION CONTACT** section.

B. What Should I Consider as I Prepare My Comments for EPA?

Do not submit information containing Confidential Business Information (CBI) to EPA through *www.regulations.gov* or e-mail. Send or deliver information identified as CBI only to the following address: Roberto Morales, OAQPS Document Control Officer (C404–02), U.S. EPA, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina 27711, Attention Docket ID EPA–HQ–OAR–2004–0018. Clearly mark the part or all of the information that you claim to be CBI. For CBI information in a disk or CD ROM that you mail to EPA, mark the outside of the disk or CD ROM as CBI and then identify electronically within the disk or CD ROM the specific information that is claimed as CBI. In addition to one complete version of the comment that includes information claimed as CBI, a copy of the comment that does not contain the information claimed as CBI must be submitted for inclusion in the public docket. Information so marked will not be disclosed except in accordance with procedures set forth in 40 CFR part 2.

C. Where Can I Get a Copy of This Document and Other Related Information?

In addition to being available in the docket, an electronic copy of today's proposed amendments is also available on the Worldwide Web (WWW) through the Technology Transfer Network (TTN). Following the Administrator's signature, a copy of the proposed amendments will be placed on the TTN's policy and guidance page for newly proposed or promulgated rules at *http://www.epa.gov/ttn/oarpg.* The TTN provides information and technology exchange in various areas of air pollution control.

D. Will There Be a Public Hearing?

Public hearings will be held concurrently with the public hearings on the proposed amendments to the NAAQS for particulate matter published elsewhere in this **Federal Register.** The EPA intends to hold public hearings during February 2006 in Philadelphia, Pennsylvania; Chicago, Illinois; and San Francisco, California. The EPA will announce the date, location, and time of the public hearings in a separate **Federal Register** notice.

E. Did EPA Conduct a Peer Review Before Issuing This Notice?

The EPA sought expert scientific review of the proposed methods, technologies, and approach for ambient air monitoring by the Clean Air Scientific Advisory Committee (CASAC). The CASAC is a Federal advisory committee established to review scientific and technical information and make recommendations to the EPA Administrator on issues related to the air quality criteria and corresponding NAAQS. CASAC constituted a National Ambient Air Monitoring Strategy (NAAMS) Subcommittee in 2003 to provide advice for a strategy for the national ambient air monitoring programs. This subcommittee, which operated over a one-year period, and a new subcommittee on Ambient Air Monitoring and Methods (AAMM), formed in 2004, provided the input for CASAC on its consultations, advisories, and peer-reviewed recommendations to the EPA Administrator.

In July 2003, the CASAC NAAMS Subcommittee held a public meeting to review EPA's draft National Ambient Air Monitoring Strategy document (dated September 6, 2002), which contained technical information underlying planned changes to the ambient air monitoring networks. The EPA continued to consult with the CASAC AAMM Subcommittee throughout the development of the proposed amendments. Public meetings were held in July 2004, December 2004, and September 2005 to discuss the CASAC review of nearly 20 documents concerning methods and technology for measurement of particulate matter (PM); data quality objectives for PM monitoring networks and related performance-based standards for approval of equivalent continuous PM monitors; reconfiguration of ambient air monitoring stations;[1] and other technical aspects of the proposed amendments. These documents, along with CASAC review comments and other information are available at: *http://www.epa.gov/ttn/amtic/casacinf.html.*

F. How Is This Document Organized?

The information presented in this preamble is organized as follows:

I. General Information
  A. Does this action apply to me?
  B. What should I consider as I prepare my comments for EPA?
  C. Where can I get a copy of this document and other related information?
  D. Will there be a public hearing?
  E. Did EPA conduct a peer review before issuing this notice?
  F. How is this document organized?
II. Overview

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[1] "Station" and "site" are used somewhat interchangeably in this notice of proposed rulemaking. When there is a difference "site" generally refers to the location of a monitor, while "station" refers to a suite of measurements at a particular site.

II. Overview

A. What Is the Purpose of Today's Proposal?

The EPA is proposing a number of changes to the ambient air quality monitoring requirements of 40 CFR parts 53 and 58 to ensure that the national network of air monitors will meet the current and future data needs of EPA (and other Federal), State, local, and tribal air quality management agencies. While much of today's proposed rule outlines changes to the monitoring requirements for particulate matter (PM), there are additional changes relating to all the other criteria pollutants (ozone (O_3), carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), and lead (Pb)) included in this proposal.

Some of these proposed changes are in support of the proposed revisions to the National Ambient Air Quality Standards (NAAQS) for PM in 40 CFR part 50 published elsewhere in today's **Federal Register**.[2] These changes are essential to implementation of the proposed NAAQS for PM. Included among these proposed PM-related changes are new provisions for addition to 40 CFR parts 53 and 58 which address approval of methods and $PM_{10-2.5}$ monitoring requirements. The added provisions would address federal reference method (FRM) equivalency determinations for continuous $PM_{10-2.5}$ monitors and the requirements for the number of $PM_{10-2.5}$ monitors a State must deploy. Another important element of the provisions for $PM_{10-2.5}$ is a proposal for the conditions under which a $PM_{10-2.5}$ monitor may be compared to the $PM_{10-2.5}$ NAAQS.

A number of amendments to existing provisions for $PM_{2.5}$ monitoring are also proposed. These would be important to the implementation of the revised $PM_{2.5}$ NAAQS because they take advantage of the experience and insight gained by EPA and the States during the past 7 years of $PM_{2.5}$ monitoring. One of the proposed $PM_{2.5}$ changes involves the criteria for FRM equivalency determinations for continuous $PM_{2.5}$ monitors. We anticipate that this change would allow States to operate continuous monitors at more required monitoring sites, providing more robust data for the $PM_{2.5}$ air quality program.

Other proposed changes are based on EPA's assessment that the monitoring regulations are not fully aligned with current data needs and opportunities across all the NAAQS pollutants—including PM but also including O_3, CO, SO_2, NO_2, and Pb. This misalignment has developed over time as ambient conditions have improved for some pollutants. Also, new monitoring technologies have been developed that provide attractive opportunities for obtaining more robust and useful data. The EPA recognized that changes were needed several years ago and since then, we have been developing the specifics of these changes with States and other stakeholders.[3] This group of proposed changes includes relaxation of some long-standing monitoring requirements which we believe are outdated or unnecessarily inflexible. This group of proposed changes also includes a new requirement for States to operate a new type of multipollutant monitoring station, which we plan to call National Core (NCore) stations. Other proposed changes relate to quality assurance requirements, monitor siting, special purpose monitoring, and data management.

We are proposing both the PM NAAQS review-related changes as well as the overarching NAAQS monitoring system changes together because they are strongly related in terms of regulatory language and in terms of implementation decision making. Resources for ambient monitoring are limited, and the cost of new types of monitoring to meet new requirements such as those for $PM_{10-2.5}$ must be offset, at least in part, by reducing resources for lower value types of monitoring. The proposed revisions to the monitoring regulations, when finalized, will improve EPA's and our monitoring partners' abilities to manage available funds to support monitoring activities and create a coordinated, integrated, multipurpose, and flexible monitoring system. In addition, it will be easier for the public to comment on the proposed changes if they are presented together rather than in sequential proposals.

The EPA notes that in the proposed regulatory language for 40 CFR parts 53 and 58, we are reprinting a number of existing provisions without change (for example, a number of definitions in current 58.1). We are doing so solely for the readers' convenience in order that the provisions we are proposing can appear in a single context. The EPA is not reproposing, reconsidering, or otherwise reopening any of these reprinted provisions. We will regard any comments as to these provisions as outside the scope of this proposal.

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[2] The proposed amendments to the National Ambient Air Quality Standards include revised standards for $PM_{2.5}$ (particulate mater with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers) and new standards for $PM_{10-2.5}$ (particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers and greater than or equal to a nominal 2.5 micrometers).

[3] Our work with States and other monitoring program stakeholders has included the development of successive versions of a draft report, ''National Ambient Air Monitoring Strategy''. The most recent version, dated December 2005, is available in the public docket. The document describes in more depth the reasons for proposing many of the changes presented in this notice, excluding the changes related to $PM_{10-2.5}$. It also discusses strategy elements that are related to, but separate from, the regulatory provisions in 40 CFR parts 53 and 58 such as funding, training, *etc.*

B. What Are the Major Changes Proposed to the Ambient Air Monitoring Regulations?

The summary of each proposed change given here ends with a reference to the part(s) of section IV of this preamble that describes that change in detail.

- We propose to require States to operate from one to three National Core (NCore) multipollutant monitoring sites.[4] Monitors at NCore multipollutant sites would be required to measure particles ($PM_{2.5}$, speciated $PM_{2.5}$, $PM_{10\text{-}2.5}$), O_3, SO_2, CO, nitrogen oxides ($NO/NO_2/NO_Y$), and basic meteorology. Monitors for all the gases except for O_3 would be required to be more sensitive than standard Federal reference method (FRM)/Federal equivalent method (FEM) monitors, so they could accurately report concentrations that are well below the respective NAAQS but that can be important in the formation of O_3 and PM. We are not proposing specific locations for these sites, but instead would collaborate on site selection with States individually and through multistate organizations. Our objective is that sites be located in broadly representative urban (about 55 sites) and rural (about 20 sites) locations throughout the country to help characterize regional and urban patterns of air pollution. We expect that in many cases States would collocate these new stations with Photochemical Assessment Monitoring Station (PAMS) sites already measuring O_3 precursors and/or National Air Toxic Trends Station (NATTS) sites measuring air toxics.

These sites would still create points of integration among the existing networks for criteria pollutants, each of which was originally designed with only a single pollutant in mind. Where collocated with sites already measuring O_3 precursors or air toxics, the degree of integration across pollutants of concern would be even stronger. Data from these NCore sites would be used for several purposes that cannot be served as well using only data available from existing networks. Forecasting of the Air Quality Index (AQI) would be improved by feeding several collocated and interdependent pollutant concentration measurements into an air quality model in near real-time to better represent current conditions, from which the model could provide an improved forecast of O_3 and particle levels for the public. Studies that track long-term trends of criteria pollutants, and thereby help demonstrate the accountability of implemented emissions control programs, would be improved by utilizing higher-sensitivity monitoring equipment for pollutants whose measured levels are well below the NAAQS. Air quality model development and validation efforts would benefit by having a long-term network of several important and interdependent measurements at improved time-scales (e.g., hourly instead of daily sample concentrations on PM methods) at a network of sites expected to remain in place over many years to allow testing of how well models simulate co-pollutant interactions. Where applicable siting criteria for PM or O_3 monitoring stations are met, NCore sites could also be used to satisfy minimum monitoring requirements for PM and O_3 and data from these stations could be used in designation decisions and in development of control strategies.[5] The NCore proposals are described more fully in section IV.E.1 of this preamble.

- We propose monitoring requirements for $PM_{10\text{-}2.5}$ which are based on deploying a network of FEM monitors that would be approved based on criteria for comparability to monitors utilizing the FRM proposed elsewhere in today's **Federal Register**. Requirements for $PM_{10\text{-}2.5}$ Class I, Class II, and Class III candidate equivalent methods would be established. The definition of a ''Class III equivalent method'' would allow for designation of continuous and semi-continuous ambient air monitoring methods for $PM_{10\text{-}2.5}$.[6] Because we intend that most of the monitors used in the $PM_{10\text{-}2.5}$ network will use continuous or semi-continuous equivalent methods, the proposal for Class III approval requirements is particularly important for $PM_{10\text{-}2.5}$. We are also proposing minimum requirements for a $PM_{10\text{-}2.5}$ monitoring network, including criteria for the number of FRM/FEM monitoring sites in each metropolitan area (which would vary from zero to five) and criteria for how monitors should be placed within an area. Closely linked to the placement criteria is a proposed test for the suitability of a $PM_{10\text{-}2.5}$ monitoring site for comparison with the $PM_{10\text{-}2.5}$ NAAQS. We are also proposing that speciation monitoring of $PM_{10\text{-}2.5}$ be required in some areas. These proposals appear in sections IV.B.2, IV.B.3, IV.B.5, and IV.B.6 (dealing with equivalent methods) and section IV.E.2 (dealing with number of monitors, their placement, and the use of data from them in comparisons to the NAAQS) of this preamble.

- We propose amendments to facilitate the wider use of continuous $PM_{2.5}$ monitors by revising performance-based FEM equivalence standards for continuous $PM_{2.5}$ monitors and allowing for approved regional methods (ARM) for continuous $PM_{2.5}$ mass monitors. Existing requirements for $PM_{2.5}$ Class I and Class II candidate equivalent methods would be revised, and new requirements for $PM_{2.5}$ Class III candidate equivalent methods would be added. The definition of a Class III equivalent method would be revised to allow for designation of continuous and semi-continuous ambient air monitoring methods for $PM_{2.5}$. These proposals appear in sections IV.B.4, IV.B.5, and IV.B.6 (FEM equivalence standards) and in section IV.D.2 (approved regional methods) of this preamble.

- In association with the proposed requirements for new $PM_{10\text{-}2.5}$ stations and new NCore multipollutant stations, we propose to remove the existing requirements for certain numbers of State and local air FRM/FEM monitoring stations for CO, PM_{10}, SO_2, and NO_2, and reduce them for Pb.

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[4] The National Core (NCore) multi-pollutant stations are part of an overall strategy to integrate multiple monitoring networks and measurements, including research grade sites and State and local air monitoring stations (SLAMS). Research grade sites would provide complex, research-grade monitoring data for special studies; the proposed amendments do not include requirements for these sites. SLAMS would include sites needed for National Ambient Air Quality Standard comparisons and other data needs of monitoring agencies. The number and placement of SLAMS monitors would vary according to the pollutant, population, and level of air quality problem. The April 2004 draft version of the National Ambient Air Monitoring Strategy presented a taxonomy in which monitoring stations belonged to three levels, called Level 1 (research sites), Level 2 (what are called NCore multipollutant sites in this notice), and Level 3 (what have been called SLAMS/NAMS (national air monitoring stations) in the past). The three Levels combined were referred to as the NCore System. We have decided to dispense with the three-level taxonomy because it does not encompass all relevant monitoring efforts. We now refer to the collection of all ambient air monitoring—including research sites, all types of monitoring by States and Tribes, and all types of ambient monitoring by Federal agencies—as the National Ambient Air Monitoring System (NAAMS). We are retaining the ''NCore'' label for the multipollutant sites in particular, because the term with this meaning has become part of the vocabulary of the State/local monitoring community.

[5] While not a part of our rationale for requiring States to operate these sites, we note that the data from them will also be of use in future health effects studies.

[6] Class I equivalent methods have only minor deviations or modifications from the specified reference method. Class II equivalent methods include other filter-based, integrated, gravimetric-type methods similar to the specified reference method but with greater deviations than allowed for a Class I method. Class III equivalent methods include all candidate $PM_{2.5}$ and $PM_{10\text{-}2.5}$ methods not classified as Class I or Class II. We expect that most candidate Class III equivalent methods will be continuous or semi-continuous methods.

However, States would still need EPA approval to move or remove existing monitoring stations for these pollutants.[7] To expedite reviews and provide more certainty to State planning, a specific process and several substantive criteria are proposed to govern EPA approval actions. Also, the requirement that EPA approval be obtained at the Administrator level (rather than the Regional Administrator level) for the subset of these monitors historically designated as NAMS would be eliminated, and all changes would be reviewed by the Regional Administrator.[8] In addition, the requirements for monitoring of O_3 precursors under the PAMS program would be reduced by about 50 percent. These proposed changes allow PAMS monitoring to be more customized to local data needs rather than meeting so many specific requirements common to all subject O_3 nonattainment areas; the PAMS changes would also give States the flexibility to reduce the overall size of their PAMS programs—within limits—and to use the associated resources for other types of monitoring they consider more useful. Requirements for minimum numbers of O_3 and $PM_{2.5}$ monitors would be retained, with small adjustments. The overall impact of these changes would be to retain comprehensive monitoring networks for $PM_{2.5}$ and O_3, and to reduce the number of SO_2, CO, NO_2, Pb, and PM_{10} monitors in areas that do not have air quality problems for these pollutants. $PM_{2.5}$ and O_3 monitoring would be mostly unaffected because $PM_{2.5}$ and O_3 are current nonattainment challenges and comprehensive monitoring is needed to support efforts to attain the NAAQS. Many existing monitors for SO_2, CO, NO_2, Pb, and PM_{10} can be discontinued because they are now well below the applicable NAAQS and the data from most of these monitors have low value for air quality management and research purposes. We expect reductions in the number of monitors for these pollutants nationally to be in the range of about 33 percent for SO_2 to about 90 percent for NO_2.[9] This would free up resources to go beyond minimum requirements for O_3, $PM_{2.5}$, $PM_{10\text{-}2.5}$, or other pollutants such as air toxics in areas where there are ongoing or new air quality management challenges. These proposed changes are described in sections IV.E.3 (number of $PM_{2.5}$ monitors), IV.E.4 (PM_{10} monitors), IV.E.5 (number of O_3 monitors), IV.E.6 (number of CO, SO_2, NO_2, and Pb monitors), IV.E.7 (PAMS monitors), and IV.E.8 (process and criteria for moving or removing monitors) of this preamble.

- We propose updated quality assurance (QA) requirements for all NAAQS pollutants, emphasizing the responsibility of each monitoring program for its data quality based on the use of data quality objectives for monitoring precision, data completeness, and bias. States would be required to provide for adequate, independent performance audits of FRM/FEM monitoring stations. We describe several options for how they could meet this audit responsibility. One way would be to agree to have appropriated State and Territorial Air Grant (STAG) funds retained by EPA to cover the cost of performing these audits; another option would be a partnership between State/local monitoring agencies (or independent subunits within one agency). The statistics for calculating precision and bias would also would be revised. Quality assurance requirements would be defined for $PM_{10\text{-}2.5}$ monitoring. See section IV.C of this preamble for details.
- We propose to revise the provisions regarding special purpose monitors (SPM) for all NAAQS pollutants. In certain restricted situations, data from SPM would not be usable for nonattainment designations. SPM that are FRM, FEM, or ARM monitors would be required to meet standard quality assurance requirements for their monitor type, and States would be required to report data from such SPM to the Air Quality System (AQS). See section IV.E.9 of this preamble for details.
- We propose to require that States conduct in-depth network assessments every 5 years. These assessments are intended to ensure that future gaps between data needs and monitoring operations are identified and filled in a timely manner. See section IV.E.11 of this preamble for specifics.
- We propose to move requirements for reporting certain operational data from PM samplers from 40 CFR part 50 to 40 CFR part 58, and to reduce the number of data elements required to be reported. This would put all similar data reporting requirements together in 40 CFR part 58 and allow them to apply to both FRM and FEM monitors. See section IV.G.1 of this preamble.
- We propose a new requirement for the reporting of $PM_{2.5}$ field blank data.[10] Only the data from field blanks which States are already taking into the field and weighing in their laboratories would be required to be reported under this proposal. Having the data from these field blanks available to the national monitoring community would help EPA and other researchers understand the relationship between the mass of PM that is sampled and weighed on a regular PM filter and the PM that is actually present in ambient air. See section IV.G.2 of this preamble or details.
- We propose to require State or local agencies to submit annual data certification letters, by May 1 of each year, to certify that the ambient air concentration and QA data submitted to EPA's AQS for the previous year are complete and accurate. These letters are now required on July 1 of each year. See section IV.G.3 of this preamble.
- We propose to require States to archive $PM_{2.5}$ and $PM_{10\text{-}2.5}$ filters for one year (the current requirement is only for $PM_{2.5}$ filters).[11] See section IV.G.4 of this preamble.
- We propose to increase the distance that ozone monitors should be placed downwind of roadways, to reduce the possibility that ozone readings will be artificially low due to ozone scavenging by NO emitted by vehicles on roadways. See section IV.F of this preamble.

C. When Would the Proposed Amendments Affect State and Local Governments, Tribes, and Other Stakeholders?

1. State and Local Governments

Only State governments, and those local governments that have been assigned responsibility for ambient air monitoring by their States, are subject to the mandatory requirements of 40 CFR part 58.[12]

The proposed compliance date for deployment of $PM_{10\text{-}2.5}$ monitors by States is January 1, 2009. A plan for this

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[7] Where the PM_{10} annual and 24-hour NAAQS have both been revoked, the proposed rule does not require prior EPA approval for discontinuing a PM_{10} monitor.

[8] EPA Administrator approval would continue to be required for changes to some $PM_{2.5}$ speciation monitoring stations, to any required NCore multipollutant station, and to any PAMS station.

[9] Detailed estimates of the current and expected future number of each type of monitor over the 3 years following promulgation are given in the supporting statement to the Information Collection Request for this action, available in the docket.

[10] Field blanks are filters which are handled in the field as much as possible like actual filters except that ambient air is not pumped through them, to help quantify contamination and sampling artifacts.

[11] A $PM_{10\text{-}2.5}$ "filter" from a FRM monitor would actually consist of the separate PM_{10} and $PM_{2.5}$ filters. Some equivalent methods, if approved, could involve a single $PM_{10\text{-}2.5}$ filter. All filters from both types of monitors would be subject to the archiving requirement.

[12] Throughout this preamble, "States" is meant to also refer to local governments that have been assigned responsibility for ambient air monitoring within their respective jurisdiction by their States. We also use "monitoring organization" to refer to States, local agencies, and/or Tribes conducting monitoring under or guided by the provisions of 40 CFR part 58.

deployment would be due January 1, 2008, unless an extension is granted to July 1, 2008. These plans would be subject to EPA approval at the Regional Office level.

State (or local) agencies would also be required to submit earlier annual data certification letters and make electronic reports of QA data to the AQS, starting May 1, 2009.

The proposed amendments require that State (or local) agencies fully implement the required NCore multipollutant sites by January 1, 2011 (more than 4 years after the expected date of promulgation of the amendments). A plan for this implementation, including site selection, would be due July 1, 2009.

Network assessments would be required every 5 years starting July 1, 2009.

State and local agencies would be required to comply with existing requirements in 40 CFR part 58 (including annual network review and data reporting), until the compliance date for each new requirement is reached.

Some provisions in the proposed amendments to 40 CFR part 58 (those that do not involve deployment of new monitoring stations or new types of data handling) would be effective as of the effective date of the final rule.

2. Tribes

Under the Tribal Authority Rule (TAR) (40 CFR part 49), which implements section 301(d) of the CAA, Tribes may elect to be treated in the same manner as a State in implementing sections of the CAA. However, the EPA determined in the TAR that it was inappropriate to treat Tribes in a manner similar to a State with regard to specific plan submittal and implementation deadlines for NAAQS-related requirements, including, but not limited to, such deadlines in CAA sections 110(a)(1), 172(a)(2), 182, 187, and 191. See 40 CFR 49.4(a). For example, an Indian tribe may choose, but is not required, to submit implementation plans for NAAQS related requirements, nor are they required to monitor. If a Tribe elects to do an implementation plan, the plan can contain program elements to address specific air quality problems in a partial program. The EPA will work with the Tribe to develop an appropriate schedule which meets the needs of each Tribe.

Indian tribes have the same rights and responsibilities as States under the CAA to implement elements of air quality programs as they deem necessary. Tribes can choose to engage in ambient air monitoring activities. In many cases, Indian tribes are required by EPA regions to institute strict quality assurance programs, utilize FRM or FEM when comparing their data to the NAAQS, and to insure that the data collected is qualitative and representative of their respective airsheds. For FRM and FEM monitors used for NAAQS attainment or nonattainment determinations, quality assurance requirements of 40 CFR part 58 must be followed and would be viewed by EPA as an indivisible element of a regulatory air quality monitoring program.

3. Other Stakeholders

Manufacturers of continuous $PM_{2.5}$ and $PM_{10\text{-}2.5}$ instruments would be able to apply for designation of their instruments as FEM as soon as the notice of final rulemaking is signed. The EPA is eager to receive such applications as soon as manufacturers can collect and analyze the necessary supporting data.

D. How Would EPA Implement the New Requirements?

After promulgation, we would implement the new requirements using several mechanisms. We expect to work with each State to develop the monitoring plans for their new $PM_{10\text{-}2.5}$ and NCore multipollutant monitoring stations. For example, we would negotiate the selection of required new monitoring sites (or new capabilities at existing sites) and their schedules for start up as well as plans to discontinue sites that were no longer needed. The EPA would negotiate with each State its annual grants for air quality management activities, including ambient monitoring work. We would negotiate grants that provide funding to meet minimum requirements and which have milestones for completion of necessary changes. Once States have established a new monitoring infrastructure to meet the new requirements, we would review State monitoring activities, submitted data, and plans for further changes on an annual basis.

The EPA's support for and participation in enhancing the national ambient air monitoring system to serve current and future air quality management and research needs will extend beyond ensuring that States meet the minimum requirements of the monitoring rules, including the proposed amendments. We will work with each State or local air monitoring agency to determine what affordable monitoring activities above minimum requirements would best meet the diverse needs of the individual air quality management program as well as the needs of other data users. In particular, we may negotiate with some States, and possibly with some Tribes, for the establishment and operation of some additional rural NCore multipollutant monitoring stations to complement the multipollutant stations that would be required by the proposed changes to the monitoring regulations. We also expect to work with the States, and possibly with some Tribes, to establish and operate more $PM_{10\text{-}2.5}$ speciation sites than the minimums that would be required by the proposed amendments. We expect to work with the States, and possibly with some Tribes, to establish and operate rural $PM_{10\text{-}2.5}$ mass concentration sites in less urbanized locations.

An important element of implementing the new requirements will be EPA's role in encouraging the development and application of Federal equivalent methods (FEM), in particular for continuous methods of measuring $PM_{2.5}$ and $PM_{10\text{-}2.5}$. We have determined that continuous monitoring of $PM_{2.5}$ has many advantages over the filter-based Federal reference method. One of the proposed changes makes it more practical for manufacturers of continuous $PM_{2.5}$ instruments to obtain designation for them as FEM or approved regional methods. To ensure objectivity and sound science, EPA's Office of Research and Development would continue to review applications for FEM designations based on the criteria proposed today and would recommend approval or disapproval to the EPA Administrator.

We will also provide technical guidance documents and training opportunities for State, local, and Tribal monitoring staff to help them select, operate, and use the data from new types of monitoring equipment. We have already distributed a technical assistance document on the precursor gas monitors[13] that will be part of the multipollutant sites and we have conducted three training workshops on these monitors. Additional guidance will be developed and provided on some other types of monitors with which many State monitoring staff are currently unfamiliar, and on network design, site selection, quality assurance, and other topics. While Tribes are not to be subject to the requirements of the proposed monitoring amendments,

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[13] Technical Assistance Document (TAD) for Precursor Gas Measurements in the NCore Multipollutant Monitoring Network. Version 4. U.S. Environmental Protection Agency. EPA–454/R–05–003. September 2005. Available at: *http://www.epa.gov/ttn/amtic/pretecdoc.html.*

these technical resources will also be available to them directly from EPA and via grantees, such as the Institute for Tribal Environmental Professionals and the Tribal Air Monitoring Support Center.

In partnership with States, we will also continue to plan and manage State technical assistance grants (STAG) to support the National Park Service's operation of the IMPROVE monitoring network, which provides important data for implementing both regional haze and $PM_{2.5}$ attainment programs.[14]

We will also continue to operate the Clean Air Status and Trends Network (CASTNET), which monitors for O_3, PM, and chemical components of PM in rural areas across the nation.[15] We are in the process of revising CASTNET to upgrade its monitoring capabilities to allow it to provide even more useful data to multiple data users. We expect that about 20 CASTNET sites will have new capabilities at least equivalent to the capabilities envisioned for NCore multipollutant sites. Those sites would reduce the number of, and complement, rural multipollutant sites funded with limited State/local grant funds.

We recognize that some air quality management issues require ambient concentration and deposition data that cannot be provided by the types of monitoring required by the proposed monitoring amendments and other activities addressed in today's proposal. These issues include near-roadway exposures to emissions from motor vehicles and mercury deposition. We are actively researching these issues and developing plans for monitoring programs to address them, but these issues are outside the scope of this proposal.

III. Background

A. What Is the Role of Ambient Air Monitoring in Air Quality Management?

Ambient air monitoring systems are a critical part of the nation's air quality management program infrastructure. We use the ambient air monitoring data for a wide variety of purposes as part of an iterative process in managing air quality. This iterative process involves a continuum of setting standards and objectives, designing and implementing control strategies, assessing the results of those control strategies, and measuring progress. The data have many uses throughout this system, such as: Determining compliance with the National Ambient Air Quality Standards (NAAQS); characterizing air quality status and trends; estimating health risks and ecosystem impacts; developing and evaluating emissions control strategies; and measuring overall progress for the air pollution control program. Ambient air monitoring data provide accountability for control strategy reductions by tracking long-term trends of criteria and noncriteria pollutants and their precursors. The data also form the basis for air quality forecasting and other public air quality reports.

More detailed ambient monitoring data are needed to meet current and future program and research needs. The data collected by State and local agencies under the proposed monitoring amendments would:

- Provide more timely Air Quality Index reporting to the public by supporting continuous particle measurements needed for AIRNow air quality forecasting and other public reporting mechanisms;
- Improve the development of emissions control strategies through more effective air quality model evaluation and other observational methods; and
- Support long-term health assessments that contribute to ongoing reviews of the NAAQS and other scientific studies ranging across technological, health, and atmospheric process disciplines.

B. What Is the History of Ambient Air Monitoring?

1. Statutory Authority

The EPA rules for ambient air monitoring are authorized under sections 110, 301(a), and 319 of the Clean Air Act (CAA). Section 110(a)(2)(B) of the CAA requires that each State implementation plan (SIP) provide for the establishment and operation of devices, methods, systems, and procedures needed to monitor, compile, and analyze data on ambient air quality and for the reporting of air quality data to EPA. Section 301(a) of the CAA authorizes EPA to develop regulations needed to carry out the Agency's mission and establishes rulemaking requirements. Uniform criteria to be followed when measuring air quality and provisions for daily air pollution index reporting are required by CAA section 319.

2. Ambient Air Monitoring Regulations

The EPA's procedures for determining and designating reference and equivalent methods (40 CFR part 53) have been in place since 1975 (40 FR 7049, February 18, 1975). Reference methods for criteria pollutants provide uniform, reproducible measurements of concentrations in the ambient air. Equivalent methods allow for the introduction of new and innovative technologies for the same purpose, provided the technologies produce measurements comparable to reference methods under a variety of monitoring conditions.

Subpart A of 40 CFR part 53 (General Provisions) establishes definitions; general requirements for designation of Federal reference methods (FRM) and Federal equivalent methods (FEM); procedures for submitting, processing, and approving applications; and associated provisions. The general requirements identify the applicable requirements or tests that a candidate method must meet to be approved as a FRM or FEM. All manual or automated methods must meet the applicable requirements in 40 CFR part 53, subpart C (Procedures for Determining Comparability Between Candidate Methods and Reference Methods). Automated equivalent methods for pollutants other than PM_{10} or $PM_{2.5}$ also must meet the requirements in 40 CFR part 53, subpart B (Procedures for Testing Performance Characteristics of Automated Methods for SO_2, CO, O_3, and NO_2). A manual sampler or automated method for PM_{10}, Class I equivalent method for $PM_{2.5}$, or Class II equivalent method for $PM_{2.5}$ also must meet the requirements in 40 CFR part 53, subpart D (Procedures for Testing Performance Characteristics of Methods for PM_{10}), subpart E (Procedures for Testing Physical (Design) and Performance Characteristics of Reference Methods and Class I Equivalent Methods for $PM_{2.5}$), or subpart F (Procedures for Testing Performance Characteristics of Class II Equivalent Methods for $PM_{2.5}$), as applicable. The existing rule adopts a case-by-case approach for $PM_{2.5}$ Class III candidate equivalent methods. The regulations in 40 CFR part 53 have been amended several times since 1975 to reflect the addition of new and revised reference methods and advances in monitoring methods and technologies for criteria pollutants.

In 1979 (44 FR 27558, May 10, 1979), EPA issued the first regulations for ambient air quality surveillance (40 CFR part 58) for all pollutants subject to NAAQS. Within 40 CFR part 58, subpart A (General Provisions) establishes definitions, and subpart B (Monitoring Criteria) sets requirements for quality assurance, methods, siting, operating

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[14] Additional information on EPA/National Park Service IMPROVE (Interagency Monitoring of Protected Visual Environments) Visibility Program is available at: *http://www.epa.gov/ttn/amtic/visdata.html.*

[15] Additional information on CASTNET is available at: *http://www.epa.gov/castnet/.*

schedules, and special purpose monitors. Subpart C (State and Local Air Monitoring Stations), subpart D (National Air Monitoring Stations), and subpart E (Photochemical Assessment Monitoring Stations) generally define the current monitoring networks. Appendices A through G to 40 CFR part 58 contain more detailed requirements on quality assurance; monitoring methods, network design, and siting criteria; and air quality reporting. Subpart F (Air Quality Index Reporting), subpart G (Federal Monitoring), and appendices F and G to 40 CFR part 58 define annual and daily reporting requirements.

Most of the major amendments to the monitoring regulations made after 1979 coincide with the NAAQS revisions and include the addition of provisions for PM_{10} (52 FR 24740, July 1, 1987) and $PM_{2.5}$ (62 FR 38833, July 18, 1997). Photochemical assessment monitoring stations (PAMS) were established in 1993 to monitor ozone and visibility (58 FR 8468, February 12, 1993).

3. Monitoring Networks

More than 5,500 monitors at about 3,000 sites in the State and local air monitoring stations (SLAMS) and national air monitoring stations (NAMS) networks comprise the majority of monitors measuring criteria pollutants using FRM or FEM for direct comparison to the NAAQS. The NAMS are a subset of SLAMS that are designated as national trends sites. The $PM_{2.5}$ network consists of ambient air monitoring sites that make mass or chemical speciation measurements. Within the $PM_{2.5}$ network operated by State and local agencies, there are approximately 1,200 FRM filter-based samplers and about 450 continuous monitors for mass measurements. Chemical speciation measurements are made at 54 ‘‘Speciation Trends Network’’ sites that are intended to remain in operation indefinitely and about 200 other, potentially less permanent sites used to support SIP development and other monitoring objectives. These stations collect aerosol samples and analyze the filters for trace elements, major ions, and carbon fractions.

Ambient air monitors in the PAMS network measure ozone precursors at 109 stations in 25 serious, severe, or extreme ozone nonattainment areas. The PAMS monitors use near-research-grade measurement technologies to produce continuous data for more than 50 volatile organic compounds during summer ozone seasons.

In addition to the NAMS/SLAMS/PAMS sites, there are approximately 310 ambient air toxics monitoring sites, the majority of which are Federally funded and report data to EPA's Air Quality System (AQS).

Ambient air monitoring stations also are operated by Indian Tribes. Thirty-one Tribes are currently making data from 119 individual monitors available to EPA and others. Approximately 73 Tribal sites monitor for PM_{10} and $PM_{2.5}$, and about 16 monitor for ozone.

The Clean Air Status and Trends Network (CASTNET) is cooperatively operated and funded by EPA with the National Park Service. The EPA's Office of Air and Radiation operates a majority of the monitoring stations with contractor support; however, the National Park Service operates approximately 30 stations in cooperation with EPA. It the nation's primary source for data on dry acidic deposition and rural, ground-level ozone. Operating since 1987, CASTNET is used in conjunction with other national monitoring networks to provide information for evaluating the effectiveness of national emission control strategies. CASTNET consists of over 80 sites across the eastern and western U.S. The longest data records are primarily at eastern sites. CASTNET provides atmospheric data on the dry deposition component of total acid deposition, ground-level ozone and other forms of atmospheric pollution. More information is available from the CASTNET program Web site *http://www.epa.gov/castnet/.*

The EPA is also one of many sponsors of the National Atmospheric Deposition Program/National Trends Network. The National Atmospheric Deposition Program/National Trends Network (NADP/NTN) is a nationwide network of precipitation monitoring stations. The NADP/NTN has over 200 stations spanning the continental U.S., Alaska, and Puerto Rico, and the Virgin Islands. The purpose of the network is to collect data on the chemistry of precipitation for monitoring of geographical and temporal long-term trends. While distinct from ambient air monitoring, precipitation monitoring is related in that it shares same of the same objectives, including tracking the effects of emission reduction programs. More information on NADP is available at its Internet Web site, *http://nadp.sws.uiuc.edu/.*

The EPA is a major funding sponsor of the Interagency Monitoring of Protected Visual Environments (IMPROVE) program. IMPROVE is a cooperative measurement effort governed by a steering committee composed of representatives from EPA, National Park Service, other Federal agencies, and Regional-State organizations. A total of 110 monitoring stations in Class I visibility areas have particulate matter samplers to measure speciated $PM_{2.5}$ and PM_{10} mass. Select stations also deploy transmissometer and nephelometers to measure light extinction and scattering respectively, as well as automatic camera systems. Some IMPROVE stations include an O_3 monitor. The objectives of IMPROVE are: (1) To establish current visibility and aerosol conditions in mandatory Class I areas; (2) to identify chemical species and emission sources responsible for existing man-made visibility impairment; (3) to document long-term trends for assessing progress towards the national visibility goal; (4) and with the enactment of the Regional Haze Rule, to provide regional haze monitoring representing all visibility-protected Federal Class I areas where practical. The IMPROVE stations provide very useful information on regional-scale particulate matter concentrations which can help States and EPA attribute urban concentrations of $PM_{2.5}$ to local versus regional sources and to types of sources. More information on the IMPROVE program is available on its Internet Web site, *http://vista.cira.colostate.edu/improve/.*

4. Data Storage and Dissemination Systems

a. Air Quality System. The AQS stores data collected from over 10,000 monitors, about 5,500 of which are currently active for criteria pollutants. The AQS also contains meteorological data, air toxics data, descriptive information about each monitoring station (including its geographic location and its operator), and data quality assurance/quality control information. The EPA and other AQS users rely upon the system data to assess air quality, assist in attainment and non-attainment designations, evaluate SIP, perform modeling for permit review analysis, and other air quality management functions. The AQS information is also used to prepare reports for Congress as mandated by the CAA. The AQS Web site address is: *http://www.epa.gov/ttn/airs/airsaqs/index.htm.*

b. AIRNow. AIRNow is a cross-government Web site (*http://airnow.gov/*) that provides the public with easy access to national air quality information. The Web site offers a daily forecast of conditions and associated health effects, known as the Air Quality Index (AQI), as well as real-time conditions for more than 300 cities across country. The AQI focuses on health effects that may occur within a few hours or days after breathing polluted air. The EPA calculates the AQI for ground-level ozone, particulate matter, carbon monoxide, sulfur dioxide, and nitrogen dioxide. The AIRNow Web site displays nationwide and regional real-time $PM_{2.5}$ and ozone air quality maps for 48 States and parts of Canada. The air quality data used in these maps and to generate forecasts are collected using either FRM, FEM, or techniques approved by State monitoring agencies.

c. Other existing data systems. Other existing data systems for ambient air quality-related data include EPA's National Emission Inventory (NEI) and AirData. The NEI database at *http://www.epa.gov/ttn/chief/eiinformation.html* provides information about sources that emit criteria air pollutants and estimates of annual air pollutant emissions from point, nonpoint, and mobile sources. The EPA compiles the NEI database from emissions inventories compiled by State and local environmental agencies based on State reporting requirements in 40 CFR part 51, agency rulemaking databases, and the Toxic Release Inventory data from industry. The EPA updates the NEI database every 3 years.

The AirData Web site at *http://www.epa.gov/air/data/* provides annual summaries of ambient monitoring and emissions inventory data from the AQS and NEI. The database includes emission estimates from all 50 States plus the District of Columbia, Puerto Rico, and the U.S. Virgin Islands, and provides data in a variety of formats. Other web-based data systems related to ambient air concentration data include VIEWS (*http://vista.cira.colostate.edu/views/*) to support analysis of visibility-related data from the IMPROVE network, and Web sites to support analysis of CASTNET (*http://www.epa.gov/castnet/data.html*) and NADP (*http://nadp.sws.uiuc.edu/*) data sets.

5. EPA Funding

The EPA has historically funded part of the cost of installation and operation of monitors to meet Federal monitoring requirements to defray costs for State, local, and tribal governments. Sections 103 and 105 of the CAA allow EPA to provide grant funding for programs for preventing and controlling air pollution and for some research and development efforts. States must apply for section 103 grants and State agencies must provide nonfederal matching funds for section 105 grants.

C. What Revisions to the National Ambient Air Quality Standards for Particulate Matter Also Are Proposed Today?

1. $PM_{2.5}$: Primary Standards, Secondary Standard, and Federal Reference Method

Elsewhere in this **Federal Register**, we are proposing revisions to the National Ambient Air Quality Standards (NAAQS) for particulate matter (PM). Under the proposal, the 24-hour primary standard for $PM_{2.5}$ would be reduced from the current level of 65 micrograms per cubic meter ($\mu g/m^3$) to 35 $\mu g/m^3$ (based on the three-year average of the annual 98th percentile concentrations). We also are proposing to retain the level of the current annual $PM_{2.5}$ standard at 15 $\mu g/m^3$ and to add additional constraints to the use of spatial averaging to demonstrate compliance with that standard. The EPA is also proposing to revise the current secondary standards for $PM_{2.5}$ by making them identical to the suite of proposed primary standards.

The NAAQS proposal would also make several changes to the Federal reference method (FRM) for $PM_{2.5}$ in 40 CFR part 50, appendix L. These changes would improve the operation and maintenance aspects of the $PM_{2.5}$ monitoring network. Specifically, we are proposing to adopt the ''very sharp cut cyclone'' (VSCC) as an approved second-stage impactor. The performance of the VSSC separator is equivalent to that of the WINS (Well Impactor Ninety Six) impactor currently specified in the proposed reference method and has a considerably longer service interval. We also are proposing to require dioctyl sebacate as an alternative oil approved for use in the WINS, to extend the maximum allowed time to recover filters from samplers, and to modify the filter transport temperature and post-sampling time requirements for final laboratory analysis.

2. $PM_{10\text{-}2.5}$: Primary Standard, Secondary Standard, and Federal Reference Method

The NAAQS proposal would also revise the current 24-hour primary standard for PM_{10} by replacing the indicator with a $PM_{10\text{-}2.5}$ indicator. The proposed $PM_{10\text{-}2.5}$ indicator is qualified so as to include any ambient mix of $PM_{10\text{-}2.5}$ that is dominated by resuspended dust from high-density traffic on paved roads and PM generated by industrial sources and construction sources, and exclude any ambient mix of $PM_{10\text{-}2.5}$ that is dominated by rural windblown dust and soils and PM generated by agricultural and mining sources. This standard shall not require control of agricultural sources and mining sources. The proposed level of the standard is 70 $\mu g/m^3$, based on the three-year average of the annual 98th percentile concentrations.

Accordingly, the proposed revisions to the NAAQS include a new FRM for measuring $PM_{10\text{-}2.5}$ (Reference Method for the Determination of Coarse Particulate Matter as $PM_{10\text{-}2.5}$ in the Atmosphere) to be codified in a new appendix O to 40 CFR part 50. The proposed FRM is based on the combination of two low-volume, filter-based methods, one for measuring PM_{10} and the other for measuring $PM_{2.5}$, and determines the $PM_{10\text{-}2.5}$ measurement by subtracting the $PM_{2.5}$ measurement from the concurrent PM_{10} measurement. The $PM_{2.5}$ measurement method is identical to the $PM_{2.5}$ FRM currently specified in 40 CFR part 50, appendix L (Reference Method for the Determination of Fine Particulate Matter as $PM_{2.5}$ in the Atmosphere), with the proposed changes described above. The PM_{10} measurement method is very similar and utilizes a sampler that is the same as the $PM_{2.5}$ sampler, except that it has no $PM_{2.5}$ particle size separator downstream of the PM_{10} separator. Thus, this proposed $PM_{10\text{-}2.5}$ FRM is based on the same aerodynamic particle size separation and filter-based, gravimetric technology that is also the basis of the FRM for $PM_{2.5}$ (with the proposed changes described above).

3. Data Handling Procedures for $PM_{2.5}$ and $PM_{10\text{-}2.5}$

In the PM NAAQS proposal published elsewhere in today's **Federal Register**, EPA is also proposing to revise the conditions under which spatial averaging of the annual primary $PM_{2.5}$ NAAQS would be permitted. We also propose to move the criteria for determining if spatial averaging is acceptable from section 2.8.1.6.1 of appendix D to 40 CFR part 58 to appendix N of 40 CFR part 50 (Interpretation of the National Ambient Air Quality Standards for $PM_{2.5}$). We also propose to add a new appendix P to 40 CFR part 50 (Interpretation of the National Ambient Air Quality Standards for $PM_{10\text{-}2.5}$) to provide data handling procedures for $PM_{10\text{-}2.5}$.

4. Revocation of National Ambient Air Quality Standards for PM_{10}

In the PM NAAQS proposal, we are proposing to revoke the current annual PM_{10} standard immediately should we finalize the primary standards for $PM_{10\text{-}2.5}$ proposed in that notice. Further, we propose that the current 24-hour PM_{10} standard be revoked in all areas except for 20 areas listed in section III of the NAAQS proposal preamble.

D. How Do the Monitoring Data Apply to Attainment or Nonattainment Designations and Findings?

The criteria for determining when it is appropriate to compare ambient monitoring data from a specific monitor and period to a National Ambient Air Quality Standard (NAAQS) is an important element of the air quality management system because it can identify what geographic areas have air quality problems and may be designated as nonattainment.

Later sections of this preamble, discussing the proposed monitoring requirements for the proposed $PM_{10\text{-}2.5}$ NAAQS and the proposed provisions for special purpose monitors (SPM), discuss the use of monitoring data for attainment or nonattainment designations. We are also proposing a change related to the required spacing between ozone (O_3) monitors and roadways. Finally, we are proposing changes to some quality assurance requirements. This section of the preamble provides background information on current EPA policy and regulations in order to facilitate informed public comment on these aspects of today's proposal.

There are some preconditions to use of data from an ambient monitor for comparison to an NAAQS that generally apply to the current NAAQS for O_3, PM_{10}, $PM_{2.5}$, CO, SO_2, NO_2, and Pb, with a few exceptions and/or the opportunity for waiver by EPA.[16] These include the following:

- The monitoring site must represent ambient air, as defined in 40 CFR 50.1 (*i.e.*, ''that portion of the atmosphere, external to buildings, to which the general public has access''). In practical terms, this means that data from monitoring sites within the boundaries of a privately-owned facility to which public access is restricted, for example, a storage yard of a factory, are not eligible for comparison to the NAAQS. (On occasion, EPA has relied on data from such sites when the air sampled is ambient air, even though the monitor may be sited on a facility to which public access is restricted (*e.g.*, the monitor is very close to a fence line and is monitoring the conditions that are present in the adjacent publicly accessible property.) Data from a monitor in ambient air as so defined can be compared to the NAAQS even if members of the public infrequently come near the monitor's location (*e.g.*, O_3 monitors that are located on the ground on high elevation mountain sites). However, data from monitors located high above standing/walking ground level, such as on a high roof or tower, are not eligible for comparison to an NAAQS. It should be noted that although monitors are often sited with the intention to represent an area of a certain geographic scale, in general, a monitor need not be representative of the ambient air quality across an area of any specific size to be eligible for comparison to most NAAQS. However, as described in section IV.E.2 of this preamble, the current annual $PM_{2.5}$ NAAQS is an exception, and the proposed 24-hour $PM_{10\text{-}2.5}$ NAAQS would be an exception. (See also the item in this list regarding proximity of O_3 and CO monitors to roadways.)
- The monitor must use a Federal reference method (FRM) or Federal equivalent method (FEM).
- The monitoring data must be technically valid so as to be truly representative of the actual air quality at its location during the sampline period, subject to the normal limitations of the FRM or FEM when properly operating. Generally, this means that the monitor's operation and subsequent sample handling and laboratory analysis, if applicable, must observe minimum quality assurance (QA) procedures, as set forth in 40 CFR 58.10 and 40 CFR part 58, appendices A and B (consolidated into a single appendix A in the proposed amendments), to guard against equipment malfunction, miscalibration, drift, or operator error. When States document that these procedures have been followed, the data are presumed to be valid although specific evidence of instrument faults or procedural errors can cause EPA to disregard data from particular periods. When documentation on whether these specific procedures have been followed is not available to EPA, as may be the case if a State has not submitted QA data to the Air Quality System (AQS) or if the monitoring was performed by a non-State organization not subject to the QA requirements in 40 CFR part 58, appendices A and B, the validity of data is considered on a case-by-case basis if the issue is raised by EPA, the State, or another party during an NAAQS designation process.
- The monitoring probe inlet (or open path, for open path monitors) must meet certain requirements for distance from adjacent roadways. This is a feature of the current monitoring requirements in 40 CFR part 58, appendix E (Probe and Monitoring Path Siting Criteria for Ambient Air Quality Monitoring) and the proposed amendments.[17] Ozone monitors too close to a roadway may be measuring air in which O_3 has been scavenged by nitric oxide (NO). Carbon monoxide and NO_2 monitors that are too close to a roadway can measure concentrations that do not represent likely human exposures of any significant frequency or duration. Requirements regarding spacing from roadways can be waived if no other suitable site is available.
- The monitoring probe inlet (or open path, for open path monitors) must meet certain minimum distance limits for proximity to nearby obstructions, such as walls of buildings.
- The probe height above the surface on which the public would stand or walk nearby must be within a certain range so that the air it samples is reasonably representative of what the public breathes when near the monitor. This requirement can be waived for practicality reasons.
- The monitoring data must be sufficiently complete according to requirements defined for each NAAQS in 40 CFR part 50, appendices H, I, K, and N (a new appendix P proposed elsewhere in today's **Federal Register** would add completeness requirements for $PM_{10\text{-}2.5}$).[18]

In addition to these generally applicable preconditions or restrictions, the current requirements of 40 CFR part 58 contain the following special provisions for $PM_{2.5}$:

- Data from a $PM_{2.5}$ monitor can be compared to the annual or 24-hour $PM_{2.5}$ NAAQS only if its location is ''population-oriented.''[19] ''Population-

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[16] Monitors that have received waivers are eligible for comparison to their respective NAAQS.

[17] Minimum separation distance requirements in the current rule apply to O_3, NO_2, CO, Pb (for stations designed to assess concentrations from mobile sources) and PM (PM_{10} and $PM_{2.5}$). Under the proposed amendments, minimum separation distance requirements would apply to O_3, oxides of nitrogen (NO, NO_2, NO_X, NO_y), CO, PM (PM_{10}, $PM_{2.5}$, $PM_{10-2.5}$) and Pb for stations designed to assess concentrations from stationary or mobile sources.

[18] Interpretation of the 1-Hour Primary and Secondary National Ambient Air Quality Standards for Ozone; Interpretation of the 8-Hour Primary and Secondary National Ambient Air Quality Standards for Ozone; Interpretation of the National Ambient Air Quality Standards for PM_{10}; Interpretation of the National Ambient Air Quality Standards for $PM_{2.5}$; and Interpretation of the National Ambient Air Quality Standards for $PM_{10\text{-}2.5}$, respectively.

[19] Section 2.8.1.2.3 of appendix D to 40 CFR part 58 states that $PM_{2.5}$ data from state or local air monitoring systems (SLAMS) and special purpose monitors (SPM) that are ''* * * representative of relatively unique population-oriented microscale or localized hot spot or unique population-oriented middle scale impact sites are only eligible for comparison to the 24-hour $PM_{2.5}$ NAAQS.'' However, under certain circumstances, the Regional Administrator may approve population-oriented microscale or middlescale impact sites for comparison to the annual NAAQS.

oriented monitoring or sites'' is described in 40 CFR 50.1 as applying to residential areas, commercial areas, recreational areas, industrial areas, and other areas where a substantial number of people may spend a significant fraction of their day.

- Data from a $PM_{2.5}$ monitor that is located in a ''microscale'' location, meaning it is influenced by a nearby emissions source while locations somewhat further away would be much less influenced, can be compared to the annual $PM_{2.5}$ NAAQS only if its location is representative of many other locations in the surrounding urban area, such that significant numbers of people can be expected to have similar $PM_{2.5}$ concentration exposures as people living, working, or visiting the location of the monitor in question (section 2.8.1.2.3 of appendix D to 40 CFR part 58).
- Under certain conditions, a State may, with the approval of EPA, average data from specified monitors for purposes of comparing the data to the annual $PM_{2.5}$ NAAQS. To be approved for spatial averaging, as it is known, monitors must meet certain requirements for relative location and measure concentrations as specified in section 2.8 of appendix D to 40 CFR part 58 (section 4.7.5 of proposed appendix D to 40 CFR part 58).[20]
- The first two complete calendar years of data from an SPM for $PM_{2.5}$ may be excluded from comparisons to the $PM_{2.5}$ NAAQS, but only if the monitor is not continued beyond those 2 years (section 2.8.1.2.2 of appendix D to 40 CFR part 58).

The first three of these four special provisions for $PM_{2.5}$ are tied to the reliance by EPA on community epidemiology studies in setting the form and levels of the annual and 24-hour $PM_{2.5}$ NAAQS. In simple terms, EPA determined that the levels of these NAAQS would be appropriately protective of public health based on a presumption that NAAQS compliance determinations would be made using data only from monitors that represented concentrations to which a large portion of the population would be exposed, even though some individuals would have higher or lower exposures.

Finally, EPA has policies addressing situations in which natural events and exceptional events have, or may have, influenced monitored concentrations. Under these policies, States may make the case that data from an otherwise eligible monitor from a specific period should not be used in comparisons to the NAAQS. We expect to revise these policies and codify them in 40 CFR part 50 in a separate rulemaking.[21]

IV. Proposed Monitoring Amendments

A. What Are the Proposed Terminology Changes?

In 40 CFR 58.1, we propose to replace the definition of ''National Air Monitoring Stations (NAMS)'' with a new definition for the ''National Core (NCore)'' network. The NCore designation[22] structure would be based on a tiered system of measurements including complex research-oriented stations,[23] multipollutant stations equipped to support a better understanding of ozone, particulate matter (PM), and PM precursors, and sites with as few as one measured pollutant identified as State and Local Air Monitoring Stations (SLAMS) that are primarily intended to support compliance with the National Ambient Air Quality Standards (NAAQS).

We are proposing to add a definition for the term, ''approved regional methods'' (ARM) to 40 CFR 58.1. This term refers to alternative $PM_{2.5}$ methods that have been approved by EPA for use specifically within a State, local, or tribal air monitoring network for purposes of comparison to the NAAQS and to meet other monitoring objectives, but which may not have been approved as Federal equivalent methods (FEM) for nationwide use. The proposed testing criteria for approval of ARM are specified in 40 CFR part 58, appendix C (Ambient Air Monitoring Methodology).

In 40 CFR 53.1, we are proposing to revise the definition of the term ''Class III equivalent method'' to apply only to continuous or semi-continuous methods having 1-hour (or less) measurement resolution. The revised definition would read:

> * * * an equivalent method for $PM_{2.5}$ or $PM_{10\text{-}2.5}$ that is an analyzer capable of providing $PM_{2.5}$ or $PM_{10\text{-}2.5}$ ambient air measurements representative of 1-hour or less integrated $PM_{2.5}$ or $PM_{10\text{-}2.5}$ concentrations as well as 24-hour measurements determined as, or equivalent to, the mean of 24 consecutive 1-hour measurements.

Restricting the Class III definition as proposed would offer a technical advantage by allowing the establishment of more tolerant minimum performance limits than would be necessary if non-continuous methods were included.

We are also proposing to add a definition of the term ''PM_{10c}'' to 40 CFR 53.1. This term refers to PM_{10} measurements obtained with a specially-approved sampler that meets more demanding performance specifications than high-volume PM_{10} samplers described in 40 CFR part 50, appendix J (Reference Method for the Determination of Particulate Matter as PM_{10} in the Atmosphere). Measurements obtained with PM_{10c} samplers are intended to be paired with $PM_{2.5}$ measurements from Federal reference method (FRM) samplers as part of the difference measurement ($PM_{10\text{-}2.5}$ equals PM_{10c} minus $PM_{2.5}$) specified in the proposed appendix O to 40 CFR part 50 (Reference Method for the Determination of Coarse Particulate Matter as $PM_{10\text{-}2.5}$ in the Atmosphere) published elsewhere in today's **Federal Register**.

B. What Are the Proposed Requirements for Approval of Reference or Equivalent Methods?

The provisions of 40 CFR part 50 and related appendices define certain ambient air monitoring methods (or methodology) as reference methods for the purpose of determining attainment of the National Ambient Air Quality Standards (NAAQS). Under 40 CFR part 53, EPA designates specific commercial instruments or other versions of methods as Federal reference methods (FRM). Furthermore, to foster the development of improved alternative air monitoring methods, EPA also designates alternative methods that are shown to have comparable performance as Federal equivalent methods (FEM). Explicit performance tests, performance standards, and other requirements for designation of both FRM and FEM are provided in 40 CFR part 53 for each of the criteria pollutants. Only designated reference or equivalent methods may be used in the States' air surveillance monitoring networks. A list of all methods that EPA has designated as either FRM or FEM for all criteria pollutants is available at *www.epa.gov/ttn/amtic/criteria.html.*

Elsewhere in this **Federal Register**, EPA is proposing a new reference method (40 CFR part 50, appendix O) for the measurement of coarse

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[20] Changes to the requirements for spatial averaging are proposed elsewhere in this **Federal Register**.

[21] These policies on natural and exceptional events will be discussed in the preamble to the Natural and Exceptional Events rule to be published in the near future.

[22] Because the terms, SLAMS and NAMS, are used extensively through the current rules, this terminology change results in numerous changes. For clarity, we are publishing the entire text of 40 CFR part 58, appendix D (Network Design Criteria for Ambient Air Quality Monitoring).

[23] The NCore research grade station designation is defined in the proposed amendments in anticipation that these stations will be initiated at some time in the future. We are not proposing to require (or to fund) NCore research grade stations in this notice.

particulate matter (PM) in the ambient air. Concurrent with the proposal of this new reference method, EPA is also proposing amendments to 40 CFR part 53 to extend the designation provisions to methods for $PM_{10-2.5}$. These proposed amendments would set forth explicit tests, performance standards, and other requirements for designation of specific commercial samplers, sampler configurations, or analyzers as either FRM or FEM for $PM_{10-2.5}$, as appropriate.

The EPA recognizes that the $PM_{10-2.5}$ reference method, while providing a good standard of performance for comparison to other methods, is not itself optimal for routine use in large $PM_{10-2.5}$ monitoring networks. Accordingly, EPA is specifically encouraging the development of alternative methods (and particularly continuous monitoring methods) for $PM_{10-2.5}$ by focusing on the explicit test and qualification requirements necessary for designation of such types of methods as equivalent methods for $PM_{10-2.5}$. Virtual-impactor technology provides a more direct measurement of $PM_{10-2.5}$ and can provide an integrated $PM_{10-2.5}$ sample filter for chemical species analyses that can be important in the development of $PM_{10-2.5}$ control strategies. Continuous (or semi-continuous) methods for $PM_{10-2.5}$ typically provide significant operational advantages over 24-hour integrated monitoring methods, such as a self-contained automatic measurement process for output of nearly real-time measurements, reduced on-site service and off-site filter analysis and support requirements, and measurement resolution of one-hour or less. In addition, corresponding provisions for considering the designation of continuous or semi-continuous equivalent methods for $PM_{2.5}$ are also being proposed, since such provisions are similar to those for $PM_{10-2.5}$ and are not currently included in 40 CFR part 53. The nature of the proposed new provisions for automated methods, which can accommodate a wide range of potential $PM_{10-2.5}$ or $PM_{2.5}$ measurement technologies, is based primarily on ambient air testing at diverse monitoring sites to demonstrate that the level of comparability to collocated reference method measurements is adequate to meet established data quality objectives. Furthermore, some existing requirements for designation of alternative, non-continuous methods for $PM_{2.5}$ would be modified to be more consistent with the more advanced new requirements for non-continuous methods for $PM_{10-2.5}$ and for continuous methods.[24]

1. Proposed Requirements for Candidate Reference Methods for $PM_{10-2.5}$

Because of the nearly complete similarity between the specifications of the proposed $PM_{10-2.5}$ reference method and the existing $PM_{2.5}$ reference method, the proposed designation requirements for $PM_{10-2.5}$ reference methods are essentially the same as those for $PM_{2.5}$ reference methods.[25] In fact, EPA proposes that a $PM_{10-2.5}$ sampler pair consisting of samplers that have been shown to meet the $PM_{2.5}$ reference method requirements (except for the $PM_{2.5}$ particle size separator in the case of the PM_{10c} sampler) may be designated as a $PM_{10-2.5}$ reference method without further testing.

2. Proposed Requirements for Candidate Equivalent Methods for $PM_{10-2.5}$

As noted, EPA will strive to encourage the development of improved alternative air monitoring methods by providing for their designation as equivalent methods. But developing suitable qualification requirements for equivalent methods for $PM_{10-2.5}$ is complicated by the complex physical and chemical nature of PM, the definition of $PM_{10-2.5}$ that to some extent incorporates the nature of the measurement technique defined in the reference method, and a wide variety of alternative $PM_{2.5}$ measurement techniques that are or may become available or may be technically feasible. Alternative methods must be shown to provide concentration measurements closely comparable to those obtained with reference methods. Thus, the requirements established for designation of equivalent methods must identify candidate methods that can achieve that goal, while also having reasonable testing protocols that are not so extensive or burdensome as to effectively inhibit approval of adequate and suitable improved or alternative candidate methods.

In light of these constraints, EPA previously defined three classes of $PM_{2.5}$ candidate equivalent methods in 40 CFR part 53 with progressively greater equivalent method qualification burdens. Class I equivalent methods are limited to methods having "* * * only minor deviations or modifications * * *" from the specified reference method and have the most modest requirements for equivalent method designation (in addition to the applicable reference method designation requirements). Class II equivalent methods include other filter-based, integrated, gravimetric-type methods similar to the reference method, but with greater deviation than allowed for Class I. Class III equivalent methods include all other candidate $PM_{2.5}$ methods not classified as Class I or II. The proposed amendments would extend the definition of Class I, Class II, and Class III candidate equivalent methods to $PM_{10-2.5}$.

Because Class I equivalent methods for $PM_{10-2.5}$ differ only very modestly from $PM_{10-2.5}$ reference methods, designation requirements would also be very similar. The EPA is proposing that $PM_{10-2.5}$ Class I equivalent methods be designated if the samplers of the $PM_{10-2.5}$ sampler pair are shown to meet all requirements for either $PM_{2.5}$ reference methods or Class I equivalent methods. As for $PM_{10-2.5}$ reference methods, no further tests would be required.

One type of Class II equivalent sampler for $PM_{10-2.5}$ could be based on virtual impactor technology, which is designed to separate coarse mode aerosols from fine mode aerosols. The resulting size-segregated filter samples could be of great importance to State, local, and tribal agencies to obtain $PM_{10-2.5}$ sample filters for chemical speciation analyses. Class II methods, having greater deviation from the reference method, would have more extensive designation requirements. These methods still typically have many similarities to the reference method, and therefore, many of the reference method designation requirements would apply to Class II candidate equivalent methods. Generally, these methods must be subject to extensive laboratory and wind-tunnel tests to determine their performance relative to the performance of the reference method. However, for methods that have only one substantial difference from the reference method specifications (such as a virtual impactor particle-size separator), only those laboratory tests pertaining to the

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[24] For this reason, we view our proposal as consistent with the objectives of section 6102 of the Transportation Equity Act for the 21st Century. See section VI.5 of the preamble for the proposed amendments to the National Ambient Air Quality Standards for particulate matter published elsewhere in this **Federal Register**.

[25] The proposed $PM_{10-2.5}$ reference method specifies a pair of samplers consisting of a conventional $PM_{2.5}$ sampler and a special PM_{10} sampler. The $PM_{2.5}$ sampler must meet all requirements for a $PM_{2.5}$ reference method in 40 CFR part 50, appendix L. However, the PM_{10} sampler required by the proposed method is not a conventional PM_{10} sampler as described in 40 CFR part 50, appendix J; rather, it is a sampler specified to be identical to the $PM_{2.5}$ sampler of the pair, except that the $PM_{2.5}$ particle size separator is removed. This special PM_{10} sampler is identified as a "PM_{10c}" sampler to differentiate it from conventional PM_{10} samplers that meet the lesser requirements of 40 CFR part 50, appendix J.

performance of the deviating component would be required. Further, for methods that have more deviation from the reference method specifications, the proposed requirements would provide an option to substitute more extensive field comparison tests for some or all of the extensive laboratory tests that would otherwise be required. Since such additional field tests would be similar to field test requirements proposed for $PM_{10-2.5}$ methods, concurrent field testing for $PM_{2.5}$ and $PM_{10-2.5}$ methods could be carried out. Concurrent testing would substantially reduce the testing burden for candidate equivalent methods that measure both $PM_{2.5}$ and $PM_{10-2.5}$ (such as a dichotomous, virtual impactor sampler), which could be tested simultaneously for designation as an equivalent method for both PM indicators.

3. Continuous Methods for $PM_{10-2.5}$

The EPA recognizes that filter-based measurement methods for either $PM_{2.5}$ or $PM_{10-2.5}$ that require manual gravimetric analysis, as embodied in the corresponding reference methods, as well as Class I and Class II equivalent methods, are by nature very labor intensive. They are expensive to operate in routine monitoring networks and can generally provide only delayed reporting of multiple-hour integrated measurements. Self-contained, continuous-type automated monitoring methods (analyzers), such as those that are commonly used for monitoring various gaseous pollutants, overcome many of these shortcomings. Various types of continuous (or nearly continuous) analyzers have been developed or are under development for $PM_{2.5}$ and $PM_{10-2.5}$ that offer substantial advantages over manual methods for implementation in routine air monitoring. These advantages include reduced operational cost, greater practicality for daily operation, availability of short-term measurements such as one-hour averages, and the possibility for near real-time, telemetered measurement acquisition. Accordingly, EPA is very interested in encouraging the further development of these continuous-type methods by providing requirements for designating such methods as Class III equivalent methods, so that they can be used in monitoring networks. Because no such explicit requirements exist, EPA is today proposing new Class III designation requirements for both $PM_{2.5}$ and $PM_{10-2.5}$.

Unfortunately, the continuous-type methods for $PM_{2.5}$ and $PM_{10-2.5}$ often tend to have performance characteristics somewhat different than those of the corresponding reference method. Consequently, adequate comparability to the corresponding reference method measurements may be technically difficult to achieve. Thus, the comparability testing requirements for Class III candidate methods must be sufficiently sophisticated to effectively differentiate between a method that shows adequate comparability and one that does not. At the same time, the designation qualification requirements must not be impractically extensive or burdensome, such that monitoring instrument manufacturers seeking designation for their analyzers cannot afford or economically justify the testing regimen.

We are proposing to narrow the definition of Class III equivalent methods to apply only to continuous or semi-continuous analyzer methods having one-hour (or less) measurement resolution, because such methods are of the most interest to the air quality monitoring community. While it would be possible to develop new, noncontinuous (or non-semicontinuous) $PM_{2.5}$ or $PM_{10-2.5}$ methods that would be categorized as Class III as currently defined, there is little, if any, technical need or economic incentive for instrument manufacturers to do so. Restricting the Class III definition to continuous analyzers, as proposed, would offer a substantial technical advantage by allowing the establishment of somewhat more tolerant limits of adequate comparability than would be necessary if non-continuous methods were included. This statistical advantage arises because the analyzers are operated continuously rather than on an intermittent, one-in-six day or one-in-three day schedule, which is typical of manually operated sampler methods.

Any of the currently existing or proposed requirements for designation of reference methods and Class I and Class II equivalent methods for $PM_{2.5}$ or $PM_{10-2.5}$ that would or should reasonably apply to a specific Class III candidate method would be required for the candidate Class III equivalent method, as well. But because of the wide variety of measurement techniques or technologies possible for a Class III candidate method, many of these existing requirements would not, or may not, apply. Therefore, the proposed requirements for $PM_{2.5}$ and $PM_{10-2.5}$ Class III candidate equivalent methods are based largely on demonstrating comparability between candidate method measurements and concurrent reference method measurements when both methods are collocated at several diverse monitoring and during different seasonal periods. These proposed requirements would be added to subpart C of 40 CFR part 53. Because we intend that most of the $PM_{10-2.5}$ monitors in the network use continuous or semi-continuous methods, the proposal of Class III approval requirements is particularly important for $PM_{10-2.5}$.

Although candidate $PM_{2.5}$ and $PM_{10-2.5}$ Class III equivalent methods would have hourly measurement resolution, this capability would not be subject to comparability requirements because both $PM_{2.5}$ and $PM_{10-2.5}$ FRM have only 24-hour measurement capability.

In developing these proposed new requirements for $PM_{2.5}$ and $PM_{10-2.5}$ Class III candidate equivalent methods, EPA has attempted to provide requirements that effectively reject inadequately comparable methods while minimizing the testing burden to the extent possible. Because the performance characteristics of Class III methods are likely to vary at monitoring sites having differing climatic and aerosol conditions, comparison tests would be required at sites in three specified areas of the continental U.S. during winter and summer seasons (winter in only one of the areas). The EPA believes these requirements would provide the minimum of test venues necessary to represent an adequate degree of monitoring site diversity for designation of a candidate equivalent method. However, EPA specifically solicits comments on the adequacy of the proposed geographical test areas, the appropriateness of the proposed seasonal requirements, and whether an additional test site may be needed (including the nature of such an additional site).

4. Specific Requirements for Class III Equivalent Methods

The proposed amendments to 40 CFR part 53 would revise the requirements for comparison tests and the allowable quantitative deviation from reference method measurements that are based on statistical analyses. The EPA has previously used a documented procedure[26] and a special computer software aid[27] to establish data quality objectives (DQO) for $PM_{2.5}$ monitoring data so that such data can be used effectively in making decisions regarding attainment of the NAAQS for PM. Using these established DQO and the software, statistical analyses of both

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[26] U.S. Environmental Protection Agency. Guidance for the Data Quality Objectives Process. EPA QA/G–4, EPA/600/R–96/055. August 2000.

[27] U.S. Environmental Protection Agency (2004b) DQO Companion Tool, Version 2.0. 2004. *http://www.epa.gov/ttn/amtic/dqotool.html.*

actual and simulated $PM_{2.5}$ monitoring data [28] [29] were carried out to confirm the suitability of the statistical parameters selected to describe a comparison relationship between the candidate and reference methods and to set appropriate and optimal limits for their values in the proposed Class III equivalent method tests. These quantitative requirements then define the minimum candidate method comparability performance that would be necessary to provide $PM_{2.5}$ monitoring data of sufficient quality to meet the established DQO.[30] The DQO for $PM_{10\text{-}2.5}$ monitoring data have recently been developed and are incorporated into 40 CFR part 58, appendix A. These DQO are similar to the DQO for $PM_{2.5}$. Accordingly, the requirements proposed for $PM_{10\text{-}2.5}$ methods are similar to those proposed for $PM_{2.5}$ methods.[31] Furthermore, similar or parallel requirements are also proposed for Class II equivalent methods for $PM_{10\text{-}2.5}$ as well as for $PM_{2.5}$. However, the proposed requirements for Class II equivalent methods for $PM_{10\text{-}2.5}$ are stricter with regard to additive bias (intercept) since this method would also support other monitoring objectives. These latter requirements proposed for $PM_{2.5}$ Class II methods would replace the existing test requirements with the more advanced, DQO-based requirements.

The parameters selected to estimate the performance of $PM_{2.5}$ and $PM_{10\text{-}2.5}$ Class II and Class III candidate method measurements relative to the performance of the reference method in the proposed field tests are precision, correlation, and the linear regression slope and intercept of a linear plot fitted to corresponding candidate and reference method mean measurement data pairs. Statistical analyses based on the DQO model show that the precision of a candidate method is not, statistically, very important to annual concentration averages used for NAAQS attainment decisions, but would be important for a daily standard. Precision is also consequential for other important aspects and applications of the $PM_{2.5}$ or $PM_{10\text{-}2.5}$ monitoring data. Accordingly, the proposed amendments would include a minimum requirement for an estimate of the candidate method precision for 24-hour measurements.

A minimum requirement for an estimate of reference method precision in the tests, as well as a test for possible anomalous reference method measurement values, also are proposed to ensure that the quality of the reference method measurements used for the test meets the expected reference method performance. The proposed numerical limits for the Class II and III precision test requirements for both the reference and candidate methods are somewhat larger than those currently prescribed for Class I $PM_{2.5}$ methods because the Class II and III precision would be calculated as the root mean square average, rather than the simple average, of the daily precision values determined from multiple samplers or instruments. This more statistically appropriate aggregation of precision is consistent with the way precision would be expressed under proposed revisions to the data quality assessment provisions in appendix A to 40 CFR part 58.

As noted above, the proposed revision to the definition for Class III equivalent methods would require such methods to provide one-hour (or less) concentration measurements, because such short-term measurements are useful for a variety of applications. The EPA proposes that hourly measurements from Class III comparability tests be recorded and submitted as part of the required test data. No requirement for the precision of these hourly measurements is included in the proposed amendments because no one-hour DQO have been established for either $PM_{2.5}$ or $PM_{10\text{-}2.5}$ measurements and neither of the $PM_{2.5}$ or $PM_{10\text{-}2.5}$ reference methods provide one-hour data or performance goals. Nevertheless, in view of the substantial potential utility of one-hour $PM_{2.5}$ and $PM_{10\text{-}2.5}$ measurements, EPA solicits comments on whether requirements for one-hour measurement precision should be included in the Class III equivalent method designation requirements. In particular, comments are requested on whether such requirements, if included, should provide merely an assessment of one-hour precision or a specified standard of performance, and if the latter, to what extent would it be appropriate to reject a candidate method that exhibited poor one-hour precision but adequate 24-hour precision.

The regression comparability parameters proposed for Class II and Class III candidate methods would be interpreted in ways somewhat different from those now used for determining candidate method comparability for other types of candidate equivalent methods for PM. The slope (multiplicative bias) and intercept (additive bias) are the performance parameters most critical in achieving the DQO for making correct attainment decisions. However, these parameters are interrelated, and statistical analyses of simulated $PM_{2.5}$ data [32] show that the allowable limits for the intercept can be somewhat less stringent if they are made to be variable and related to the value obtained for the slope. Accordingly, EPA is proposing variable, slope-dependant limits for the intercept.

Further, because Class III $PM_{2.5}$ and $PM_{10\text{-}2.5}$ equivalent methods would be redefined as continuous or semi-continuous methods, such methods would normally be operated continuously, just as continuous gaseous pollutant analyzers are, rather than on a one-day-in-six sampling schedule typically used for $PM_{2.5}$ reference method sampling. Again, statistical analyses [33] show that this more frequent (daily) sampling allows the intercept limits to be set even wider than would be needed for one-in-six day sampling and still meet the established DQO. The actual intercept limits for $PM_{10\text{-}2.5}$ methods proposed today are somewhat more restrictive than the analyses would indicate to provide a factor of safety to account for inherent differences between the way candidate methods would be operated in the proposed equivalent method tests and the way they would be operated routinely in State monitoring networks.

Another difference in the way the conventional comparison parameters would be interpreted relates to the proposed lower limit requirement for the comparison correlation. The correlation test is instrumental in detecting longer-term method variability, such as seasonal bias. By its nature, the correlation value calculated for the comparison is quite dependent on the range of concentrations measured in the tests. The comparison tests are subject to the actual $PM_{2.5}$ or $PM_{10\text{-}2.5}$ concentrations available at the test site, which are generally related to variable atmospheric conditions during the test period and consequently may

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[28] Data Quality Objectives for PM Continuous Methods. Prepared for U.S. Environmental Protection Agency by ManTech Environmental Technology, Inc. EPA Contract 68–D–00–206, Report TR–4423–03–08, June 2003.

[29] Data Quality Objectives for PM Continuous Methods II. Prepared for U.S. Environmental Protection Agency by ManTech Environmental Technology, Inc. EPA Contract 68–D–00–206. Report TR–CAN–04–02, June 2004.

[30] Criteria for Designation of Equivalence Methods for Continuous Surveillance of $PM_{2.5}$ Ambient Air Quality. Prepared for U.S. Environmental Protection Agency by B. Coutant and J. Sanford, Battelle Columbus, EPA Contract 68–D–02–061, 2004.

[31] Method Equivalency Development for $PM_{10\text{-}2.5}$. Prepared for U.S. Environmental Protection Agency by B. Coutant, Battelle Columbus, 2005.

[32] Battelle Columbus (2004).

[33] ManTech Environmental Technology, Inc. (June 2003); ManTech Environmental Technology, Inc. (June 2004); Battelle Columbus (2004); Battelle Columbus (2005).

sometimes occur in a rather narrow range. Therefore, the minimum value proposed for this statistic is not a fixed value but rather a variable that is related to the concentration coefficient of variation (CCV), which is a measure of the range of the concentrations measured in the test. This variable limit for correlation would provide a more effective test without unnecessarily failing test data representative of an unfortunately limited range of test concentrations.

One minor difference from the reference method would be necessitated by the proposed Class III comparison tests. The proposed reference methods for $PM_{2.5}$ and $PM_{10-2.5}$ specify a sampling period tolerance of 23 to 25 hours. Experience has shown that in multiple-sampler candidate method tests, which may be frequently combined with tests of additional instruments to reduce overall testing costs, the time required to properly change sample filters and service the samplers and other instruments between sample periods often requires more than one hour. Accordingly, the proposed test protocol would allow a 22-hour minimum sample period for the reference method to allow complete sample set acquisition within a 24-hour period. This proposed revision in the reference method protocol should have very little, if any, adverse impact on the results of the comparability tests.

The proposed requirements for $PM_{10-2.5}$ and $PM_{2.5}$ Class II and Class III equivalent methods are the least stringent requirements that would provide reasonable assurance that candidate methods meeting these requirements will produce monitoring data of quality commensurate with the quality of reference method data and that the data will meet the DQO established for $PM_{2.5}$ and the proposed DQO for $PM_{10-2.5}$. While recent field studies suggest some potential $PM_{10-2.5}$ continuous methods look promising,[34] it is not certain at this time whether any current commercial continuous or nearly continuous methods can yet meet the proposed requirements for Class III methods. However, EPA believes that the establishment of these requirements would provide a definitive goal which instrument manufacturers could achieve.

5. Proposed Changes to Requirements for PM_{10} and $PM_{2.5}$ Class I and Class II Equivalent Methods

The proposed amendments would revise the existing provisions for PM_{10} and $PM_{2.5}$ Class I and II candidate equivalent methods. These changes would clarify or simplify current provisions or implement minor improvements to test protocols suggested by experience and information acquired in processing equivalent method applications for these methods. The proposed changes would have very little, if any, impact on the nature, efficacy, or extent of any of the test requirements.

In the tests for PM_{10} and $PM_{2.5}$ Class I and II candidate equivalent methods, the minimum separation distance between sampler or analyzer inlets is proposed to be reduced from 2 meters to 1 meter for instruments having flow rates less than 200 liters per minute. One meter separation has been found to be entirely adequate for such low-flow-rate instruments, and the change is consistent with a similar minimum separation allowance for audit samplers used in assessing the precision of network $PM_{2.5}$ samplers.[35] An identical change is also proposed for appendix A to 40 CFR part 58.

Another proposed change would replace existing requirements for Class II $PM_{2.5}$ equivalent methods with similar but new DQO-based requirements. These proposed requirements are similar to the Class III requirements and would be based on daily sampling. Therefore, $PM_{10-2.5}$ and $PM_{2.5}$ Class II equivalent methods used for determining compliance with the PM NAAQS would generally be restricted to daily operation. However, as discussed previously, filter-based integrated methods (such as Class II equivalent methods) are not likely to be widely used for compliance monitoring. These methods would be used more for chemical analysis of samples to characterize the species of PM in a monitoring area, which would not require daily operation of the samplers. For Class II methods (for either $PM_{2.5}$ and $PM_{10-2.5}$ methods), the test sites would be similar in character to those for Class III methods, but only two test sites (one eastern and one western) rather than three, and tests in only one season at any time of year rather than two seasons, would be required. These requirements would allow tests for $PM_{2.5}$ and $PM_{10-2.5}$ methods (or for Class II and Class III method) to be tested simultaneously, to reduced testing costs. Flow rates in the existing $PM_{2.5}$ FRM and proposed $PM_{10-2.5}$ FRM would be operated under conditions of actual ambient temperature and barometric pressure, ensuring compatibility of the measured sample flows. The EPA solicits comments on the adequacy and appropriateness of these tests requirements for Class II methods.

In addition, the proposed amendments would lower many of the minimum concentration limit specifications for various existing test requirements for PM_{10} and $PM_{2.5}$ Class I and Class II candidate equivalent methods. These minimum limits were established either to avoid possible difficulties with interpretation of test results due to increased measurement variability that often occurs at very low concentrations or to require a wide range of concentration measurements for the test. However, experience has shown that these lower limits are unnecessarily conservative and can be decreased considerably without encountering undue variability in the measurements or an insufficient range of concentrations. Further, applicants often have difficulty obtaining a sufficient number of measurement sets that meet some of these minimum limits. The proposed decreases in these minimum limits would reduce the number of test measurement sets that are rejected as unacceptable due to test concentration levels failing to meet the test requirements without compromising the efficacy of the tests. These changes would reduce the costs to applicants of conducting the tests.

6. Other Proposed Changes

The proposed amendments would make subpart C of 40 CFR part 53 easier to understand by consolidating the provisions for the various types of candidate equivalent methods. This reorganization results in numerous minor editorial and section number changes of no technical impact. The entire text of 40 CFR part 53, subpart C is reprinted in the proposed amendments.

We are proposing numerous minor changes which are needed to incorporate new provisions for $PM_{10-2.5}$ methods into subparts A, C, E, and F of 40 CFR part 53, as well as a few minor changes that would apply to methods for $PM_{2.5}$ or other pollutants. As noted above, the definition of a "Class III equivalent method" in 40 CFR 53.1 would be modified to include only methods that provide automated

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[34] U.S. Environmental Protection Agency. Multi-Site Evaluations of Candidate Methodlogies for Determining Coarse Particulate Matter ($PM_{10-2.5}$) Concentrations: August 2005 Updated Report Regarding Second-generation and New $PM_{10-2.5}$ Samplers.

[35] Quality Assurance Guidance Document: Field Standard Operating Procedures for the $PM_{2.5}$ Performance Evaluation Program. U.S. Environmental Protection Agency. Office of Air Quality Planning and Standards, November 1998, Section 4, page 8.

continuous or semi-continuous measurements of $PM_{2.5}$ and $PM_{10-2.5}$ with one-hour or less resolution. We are also proposing definitions for the terms, ''PM'', ''$PM_{10-2.5}$ sampler'', and ''PM_{10C} sampler''. Another proposed change, to paragraph (4) of 40 CFR 53.3 (General requirements for an equivalent method), would clarify that Class III $PM_{10-2.5}$ and $PM_{2.5}$ candidate equivalent methods would be subject to applicable requirements for $PM_{10-2.5}$ or $PM_{2.5}$ reference methods contained in those reference methods (40 CFR part 50, appendixes L and O) and applicable requirements for Class I and Class II equivalent methods contained in subparts E and F of 40 CFR part 53, in addition to the proposed amendments to subpart C. The requirement in 40 CFR 53.5 (Processing of applications) to publish a notice in the **Federal Register** upon receipt of an application would be deleted, as would the requirements in 40 CFR 53.51(f)(2) and 53.2(a) for manufacturers of $PM_{2.5}$ designated method samplers to submit an annual Product Manufacturing Checklist. These requirements have proved to be of little value, and the significant cost burden to the Government and to applicants for these activities can therefore be eliminated. The proposed amendments would also delete the requirement in 40 CFR 53.8 (Designation of reference and equivalent methods) for publishing a notice of designation in the **Federal Register** no later than 15 days after the date of the determination. We are proposing to delete the 15-day requirement because it is not achievable within the confines of EPA's internal review process.

C. What Are the Proposed Requirements for Quality Assurance Programs of the National Ambient Air Monitoring System?

A quality system provides a framework for planning, implementing and assessing work performed by an organization and for carrying out required quality assurance (QA) and quality control (QC) activities. The proposed amendments to 40 CFR part 58, appendix A would provide the requirements necessary to develop quality systems for the NCore, State and Local Air Monitoring Stations (SLAMS), and Prevention of Significant Deterioration (PSD) networks. The proposed revisions address responsibilities for implementing the quality system for both EPA and monitoring organizations, as well as adherence to the Agency's QA policy, data quality objectives (DQO), and the minimum QC requirements and performance evaluations needed to assess the data quality indicators of precision, bias, detectability, and completeness. In addition, the proposed amendments would describe the required frequency of the QC requirements and performance evaluations, the data to be collected, and the statistical calculations for estimates of the data quality indicators at various levels of aggregation. The revised statistical calculations would be used to determine attainment of the DQO. The proposed amendments would also identify national programs that help determine data quality comparability across individual monitoring programs.

The EPA has not conducted a thorough review of the quality system for many years. Based on our review of the existing QA program in 40 CFR part 58, appendices A and B, we are proposing changes to make the requirements consistent with our current QA policy, meet the objectives of the NCore, SLAMS, and PSD monitoring networks, and make the requirements more user-friendly. These proposed changes would produce a more consistent QA program across pollutant categories that fosters use of new technologies by more directly linking instrument performance with programmatic objectives. The proposed revisions were developed with the assistance of a stakeholder group (QA Strategy Workgroup) composed of QA representatives from EPA, State, local, and tribal monitoring organizations. Recommendations from the workgroup are provided in one of the draft versions of the National Ambient Air Quality Strategy document.[36] We solicit comments on all of the following proposed amendments to 40 CFR part 58, appendix A.

1. Consolidation of Quality Assurance Requirements

The requirements for State and local air monitoring stations (SLAMS) and prevention of significant deterioration (PSD) monitoring stations have been combined from two separate appendices, 40 CFR part 58, appendices A and B, into one single appendix A because both programs have similar QA requirements.

2. Realignment to Current EPA Quality Assurance Policies

EPA Order 5360.1 A2 requires agencies that accept Federal grant funding for their air monitoring programs to have a QA program with certain elements including quality management plans (QMP), quality assurance project plans (QAPP), and a person designated as the quality assurance manager. Many of these elements are not in the existing regulations, which predate EPA Order 5360.1 A2 (revised in 2000), but would now be added under today's proposal. Grantee agencies have been following the requirements of EPA Order 5360.1 A2 for several years, and as a result, we do not expect these proposed revisions would have a significant impact on resources beyond the existing program. Copies of EPA Order 5360.1 A2 are available in the docket for this proposal as well as on EPA's Internet site *http://www.epa.gov/quality1.*

A QMP is a document that describes an organization's quality system including its policy and procedures, functional responsibilities of management and staff, and other general practices of its data collection program. Project-specific details are documented in a QAPP. A QAPP would document, for example, how the $PM_{2.5}$ air monitoring network will be operated and how sampler performance will be controlled and data quality evaluated.

EPA Order 5360.1 A2 requires grantee agencies involved with data collection activities to identify a quality assurance manager. The proposed amendments to 40 CFR part 58, appendix A would require each State (or delegated monitoring agency) to identify and maintain a ''QA management function''. This proposed language captures the essence of the requirements in EPA Order 5360.1A2, while befitting the nature of the ambient air monitoring community which is made up of large and small (local and tribal) organizations.

The EPA also proposes to revise the QA program by emphasizing the DQO process. A DQO is a qualitative and quantitative statement that defines the appropriate quality of data needed for a particular decision—for example, the data quality necessary for EPA or a monitoring organization to make data comparisons against the National Ambient Air Quality Standards (NAAQS). The DQO help to establish the requirements for precision, bias, completeness, and detectability and the rationale for their acceptance criteria.

The proposed amendments would require monitoring organizations to

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[36] The National Ambient Air Monitoring Strategy (Final Draft). U.S. Environmental Protection Agency. Office of Air Quality Planning and Standards, APril 2004. Some of the detailed content of the April 2004 draft, including some of the workgroup recommendations are not included in the subsequent December 2005 version.

evaluate $PM_{10-2.5}$ and ozone monitoring system performance through the DQO process. This is consistent with the existing requirement for organizations to evaluate their $PM_{2.5}$ monitoring system performance using the DQO process. Priority for these evaluations is placed on $PM_{2.5}$, $PM_{10-2.5}$, and ozone as these are the pollutants of most concern across the country. Quality assurance procedures such as determining precision through collocated sampling and determining bias through an independent performance evaluation program for $PM_{10-2.5}$ are proposed to follow the same basic approach as the $PM_{2.5}$ monitoring network. The proposed precision and bias measurement uncertainty goals are identified in 40 CFR part 58, appendix A. The proposed amendments to appendix A would also specify that EPA is responsible for the development of the DQO for NCore multi-pollutant stations and State and local air monitoring stations (SLAMS).

3. Quality Assurance Requirements for PM_{10}, $PM_{10-2.5}$ and $PM_{2.5}$

The proposed QA requirements for $PM_{10-2.5}$ would follow the same approach as the requirements that currently apply to both automated and manual PM_{10} and $PM_{2.5}$ monitors. These requirements would include the implementation of flow rates audits conducted by the monitoring organization, collocated monitoring, and performance evaluations. Statistical evaluations have allowed us to reduce collocation and performance evaluation sampling frequencies without significant affects to data quality assessments.

We are proposing to amend the $PM_{2.5}$ and PM_{10} collocation sampling frequency requirement. Statistical assessments of the collocated $PM_{2.5}$ and PM_{10} data reveal that adequate estimates of precision at the primary quality assurance organization could be made at a reduced sampling frequency. Consequently, we are proposing to reduce the frequency from every 6 days to every 12 days. This change would reduce the burden on the monitoring organization without a significant effect on precision estimates. This proposal does not include a reduction in the collocation requirements for total suspended particulate (TSP) or PSD monitors. In addition, we are proposing to revise the concentration limits applicable to collocated pairs of monitors that are used to provide precision estimates. The concentration limits would be reduced from 6 micrograms per cubic meter (μg/m^3) to 3 μg/m^3 for $PM_{2.5}$ and from 20 μg/m^3 to 15 μg/m^3 for PM_{10} (high-volume samplers). Statistical evaluation of three years of $PM_{2.5}$ and PM_{10} data revealed comparable estimates of precision using data from both of these reduced concentration ranges, and that the addition of the data at these lower ranges will increase the level of confidence in the precision estimates. This proposed change would make the collocation sampling frequency requirement consistent for $PM_{2.5}$ PM_{10} and $PM_{10-2.5}$. A document describing the possible new approach is available in the docket.[37]

We are proposing to revise the sampling frequency for the implementation of the PM Performance Evaluation Program (PEP). This proposed approach used historical $PM_{2.5}$ precision and bias data to identify the minimum number of performance evaluations required for all primary quality assurance organizations to provide an adequate assessment of bias, rather than the current requirement that a uniform 25 percent of monitors in a primary quality assurance organization be evaluated each year. The revision would establish an equitable sampling frequency of five valid audits a year for organizations with less than or equal to five monitoring sites and eight valid audits a year for those organizations with greater than five monitoring sites. A valid performance evaluation audit means that both the primary monitor and PEP audit concentrations are valid and above 3 μg/m^3. As an example, if a primary quality assurance organization had 20 monitoring sites, the current requirement would require five sites (25 percent of network) to be audited four times each year (one each quarter) for a total of 20 audits. The new proposal would simply require eight audits be provided (distributed across each quarter) and that all monitoring sites be audited within a six year period in order to provide a representative estimate of bias for the monitoring network. This would equate to distributing eight audits (or five for networks less than or equal to 5) at 15 percent of the monitoring network sites. In addition, each method designation must be audited. Therefore, if a primary quality assurance organization had two different monitoring instruments in their network, both would need PEP audits each year. Since bias data quality objectives are evaluated on 3 years of PEP audits, both sampling frequencies should provide us with reasonable assessments of bias. Preliminary assessments of the impact of the possible new method show that organizations with smaller networks would need more audits but fewer audits would be needed at organizations with larger networks. The net result across all primary quality assurance organizations would be fewer audits, comparable bias results, and reduced resource burden. A document describing this possible approach is available in the docket.[38]

4. Requirements to Ensure Adequate Independent Quality Assurance for All Pollutants Subject to National Ambient Air Quality Standards

We are proposing to revise the current regulatory requirements dealing with responsibilities for independent assessments of monitoring system performance. These evaluations are the subject of sections 2.4 and 3.5.3.1 of the current appendix A to 40 CFR part 58. Section 2.4 of appendix A to 40 CFR part 58 applies to all National Ambient Air Quality Standards (NAAQS) pollutants and section 3.5.3.1 is applicable only to $PM_{2.5}$. Currently, section 2.4 of appendix A requires the monitoring organization to ''participate'' in EPA's National Performance Audit Program (NPAP). For the last few years, EPA has considered that monitoring organizations are in compliance with the requirements of section 2.4 if, at a minimum, the organizations made their monitoring sites and equipment accessible to EPA or contractors for conducting the performance evaluations. For continuous gas instruments, a performance evaluation involves the introduction of a gas or gases of independently known concentration to determine the bias of the local monitor.

Section 3.5.3.1 of appendix A to 40 CFR part 58 describes the Performance Evaluation Program (PEP) for $PM_{2.5}$. The PEP requirements are functionally similar to the NPAP requirements but differ in its specifics because of the nature of particulate matter sampling (i.e., it is not possible to introduce air with a known concentration of $PM_{2.5}$ into a monitor). Under the PEP for $PM_{2.5}$, a local monitor is evaluated by placing a second, independently-maintained Federal reference method (FRM) monitor next to the local monitor and allowing both monitors to sample for 24 hours. The filter from the independent FRM monitor is then shipped to an independent laboratory

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[37] Proposal to Change the $PM_{2.5}$ and PM_{10} Collocation Sampling Frequency Requirement, *http://www.epa.gov/ttn/amtic/pmqainf.html*

[38] Review of the Potential to Reduce or Provide a More Cost Efficient Means to Implement the $PM_{2.5}$ Performance Evaluation Program, *http://www.epa.gov/ttn/amtic/pmpep.html.*

where it is weighed and the resulting independently calculated concentration is compared to the concentration from the local monitor. The resulting difference in concentrations between the independent FRM monitor and local monitor is used to calculate the bias between the sampler results.

The monitoring organization is responsible for having these $PM_{2.5}$ performance evaluations take place, or only for giving access to its sites for EPA staff or contractors to perform them. In practice, most monitoring organizations comply with the requirements in section 3.5.3.1 by giving access to EPA staff or contractors and by accepting that EPA funds this activity by holding back part of the grant funding that might otherwise go directly to the monitoring organization. One State complies with requirements in section 3.5.3.1 by having independent audits in one part of the State performed by personnel and laboratories from the monitoring organization that is responsible for daily operations in another part of the State.

The EPA proposes to revise the text of 40 CFR part 58, appendix A to clearly provide that it is the responsibility of each monitoring organization to make arrangements for, and to provide any necessary funding for, the conduct of adequate independent performance evaluations of all its FRM or Federal equivalent method (FEM) criteria pollutant monitors. The proposed language would also clearly indicate that it is the monitoring organization's choice whether to obtain its independent performance evaluations through EPA's NPAP and $PM_{2.5}$ PEP programs, or from some other independent organization. An independent organization could be another unit of the same agency that is sufficiently separated in terms of organizational reporting and which can provide for independent filter weighing and audit gas naming. This proposed approach would ensure that adequate and independent audits will be performed but would provide flexibility in the implementation approach.

Monitoring organizations that choose to comply with the revised provisions of appendix A to 40 CFR part 58 regarding performance evaluations by relying on EPA audits, for $PM_{2.5}$, $PM_{10-2.5}$, and/or other NAAQS pollutants, would be required to agree that EPA hold back part of the grant funds they would otherwise receive directly. The EPA intends to develop guidance for monitoring organizations that choose to comply by obtaining audit services from elsewhere. To ensure national consistency and effective audits, this guidance will include provisions for EPA certification of data comparability for audit services not provided by EPA and for traceability of gases and other audit standards to national standards maintained by the National Institute for Standards and Technology.

5. Revisions to Precision and Bias Statistics

We are also proposing to change the statistics for assessment of precision and bias for criteria pollutants. Two important data quality indicators that are needed to assess the achievement of DQO are bias and precision. Statistics in the current requirements of 40 CFR part 58, appendix A (with the exception of $PM_{2.5}$) combine precision and bias together into a probability limit at the primary quality assurance organization level of aggregation. In addition, the statistical calculations of precision and bias vary among criteria pollutants and between manual and automated methods within the same pollutant. Since the DQO process uses separate estimates of precision and bias, we examined assessment methods that were statistically reasonable and simple. The proposed assessment methods are based on the QA measurements that are currently required in 40 CFR part 58, appendix A.

For sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), and ozone (O_3), we are proposing to estimate precision and bias on confidence intervals at the site level of data aggregation rather than the primary quality assurance organization. Estimates at the site level can be accomplished with the automated methods for SO_2, NO_2, CO and O_3 because there is sufficient QC information collected at the site level to perform adequate assessments. Since the criteria pollutant data are used for very important decisions (comparison to the NAAQS), providing precision and bias estimates at upper confidence limits would provide a higher probability of making appropriate decisions. The intent of this proposed change is to move organizations to a ''performance-based'' quality system. Organizations that demonstrate acceptable performance would be allowed the flexibility to reduce the frequency of certain QC checks. These agencies are expected to shift resources used for these QC checks into higher priority QA work. A document describing this possible new approach is available in the docket.[39]

The precision and bias statistics for PM measurements (PM_{10}, $PM_{10-2.5}$ and $PM_{2.5}$) would be generated at a primary quality assurance organization level because, unlike the gaseous pollutants, only a percentage of the sites have precision and bias checks performed in any year. As with the gaseous pollutants, the statistics would use the confidence limit approach. Using a consistent set of statistics would simplify procedures by removing a significant number of equations and confusing language in the appendix.

We are also proposing to change the precision and bias statistics for lead (Pb) to provide a framework for developing and assessing DQO. The QC checks for Pb come in three forms: flow rate audits, Pb audit strips, and collocation. The EPA proposes to combine information from the flow rate audits and the Pb audit strips to provide an estimate of bias. Precision estimates would still be made using collocated sampling but the estimates would be based on the upper 95 percent confidence limit of the coefficient of variation, similar to the method described for the automated instruments.

6. Program Updates

We are also proposing several QA program changes to update the existing requirements in 40 CFR part 58 to reflect current program needs and terminology:

- We are proposing to remove SO_2 and NO_2 manual audit checks. A review of all SLAMS/NAMS/PAMS sites by monitor type revealed that no monitoring organizations are using manual SO_2 or NO_2 methods, nor are any monitoring organizations expected to use these older technologies. Instead of the old manual methods, monitoring sites are using continuous methods to perform these audit checks. We are proposing to remove the manual method QC checks because the continuous check methods are covered by the current QA procedures.
- We are proposing to change the concentration ranges for QC checks and annual audit concentrations. The one-point QC check concentrations for the gaseous pollutants SO_2, NO_2, O_3 and CO would be expanded to include lower concentrations. Lower audit ranges would also be added to concentration ranges in the annual audit concentrations. Adding or expanding the required range to lower concentration ranges is appropriate due to the lower measured concentrations at many monitoring sites as well as the potential for NCore stations to monitor areas where concentrations are at trace ranges. In addition, EPA proposes that

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[39] Proposal: New Method for Estimating Precision and Bais for Gaseous Automated Methods for Ambient Air Monitoring Program, *http://www.epa.gov/ttn/amtic/files/ambient/gagc/proprecision.pdf.*

the selection of QC check gas concentration must reflect the routine concentrations normally measured at sites within the monitoring network in order to appropriately estimate the precision and bias at these routine concentration ranges.

- We are proposing to revise the PM_{10} collocation requirement. Currently, 15 percent of all $PM_{2.5}$ sites are required to maintain collocated samplers. For consistency, the proposed amendments would change the PM_{10} collocation requirement to match the $PM_{2.5}$ requirement. This proposed change would make the collocation requirement consistent for $PM_{2.5}$ PM_{10} and $PM_{10\text{-}2.5}$.
- We are proposing to amend the $PM_{2.5}$ and PM_{10} collocation sampling frequency requirement. Statistical assessments of the collocated $PM_{2.5}$ and PM_{10} data reveal that adequate estimates of precision at the primary quality assurance organization could be made at a reduced sampling frequency. Consequently, we are proposing to reduce the frequency from every 6 days to every 12 days. This change would reduce the burden on the monitoring organization without a significant effect on precision estimates. This proposal does not include a reduction in the collocation requirements for total suspended particulate (TSP) or PSD monitors. In addition, we are proposing to revise the concentration limits applicable to collocated pairs of monitors that are used to provide precision estimates. The concentration limits would be reduced from 6 micrograms per cubic meter ($\mu g/m_3$) to 3 $\mu g/m_3$ for $PM_{2.5}$ and from 20 $\mu g/m_3$ to 15 $\mu g/m_3$ for PM_{10} (high-volume samplers). Statistical evaluation of 3 years of $PM_{2.5}$ and PM_{10} data revealed comparable estimates of precision using data from both of these reduced concentration ranges, and that the addition of the data at these lower ranges will increase the level of confidence in the precision estimates. This proposed change would make the collocation sampling frequency requirement consistent for $PM_{2.5}$ PM_{10} and $PM_{10\text{-}2.5}$.
- We are proposing to revise the requirements for $PM_{2.5}$ flow rate audits. Based on an evaluation of flow rate data and discussions within the QA Strategy Workgroup, we are proposing to reduce the frequency of flow rate audits from quarterly to semiannually and remove the alternative method which allows for obtaining the precision check from the analyzers internal flow meter without the use of an external flow rate transfer standard. Most monitoring organizations participating in the QA Strategy Workgroup considered auditing with a external transfer standard to be the preferred method and believed that the quarterly audit data demonstrates the instruments are sufficiently stable to reduce the audit frequency. The proposed amendments would provide an efficient and effective approach by reducing audit frequency to an adequate level while ensuring the use of a preferred approach.

D. What Are the Proposed Monitoring Methods for the National Ambient Air Monitoring System?

1. Federal Reference Methods and Federal Equivalent Methods

Monitoring methods used in the multi-pollutant NCore and SLAMS networks would include Federal reference methods (FRM), Federal equivalent methods (FEM), and other methods designed to meet the data quality objectives of the network being deployed. When appropriate, the proposed amendments place emphasis on continuous methods over filter-based methods to provide for highly time-resolved data for better characterization of diurnal patterns of air pollution and for timely public availability of data. While more emphasis is placed on continuous methods, a limited number of filter-based methods would still be retained in most networks to tie together historical data sets with new monitoring data. EPA's strategy for selecting the proposed monitoring methods for the National ambient air monitoring system was to select methods that meet data quality objectives for each pollutant and that have the most utility to support multiple monitoring objectives. Specifics on the monitoring methods proposed for use at each type of site are described below.

- A wide variety of research, FRM/FEM or other routine methods could be used at NCore research-grade stations. Maximum flexibility is provided in the proposed amendments for these sites because they would be used to investigate the atmospheric processes and air chemistry that go beyond the capabilities of characterizing the air with routine monitoring methods.
- NCore multi-pollutant stations would use FRM or FEM for criteria pollutants when the expected concentration of the pollutants are at or near the level of the National Ambient Air Quality Standards (NAAQS). For criteria pollutant measurements of carbon monoxide (CO) and sulfur dioxide (SO_2), where the level of the pollutant is well below the NAAQS, it may be more appropriate to operate higher sensitivity monitors than FRM or FEM. In these cases, the higher sensitivity methods are expected to support different monitoring objectives than the FRM or FEM. In some limited cases, higher-sensitivity gas monitors have also been approved as FEM and can serve both NAAQS and other monitoring objectives. Options for high-sensitivity measurements of CO, SO_2, and total reactive nitrogen (NO) are described in the report, ''Technical Assistance Document for Precursor Gas Measurements in the NCore Multipollutant Monitoring Network.''
- State and local air monitoring stations would use FRM or FEM for criteria pollutants. For $PM_{2.5}$, these sites could also use approved regional methods (ARM), which are described in section IV.D.2 of this preamble.
- Photochemical assessment monitoring stations (PAMS) would use the ozone (O_3) ultraviolet photometry FEM and the nitric oxide (NO) and nitrogen dioxide (NO_2) chemiluminescence FRM for criteria pollutant measurements. Methods for volatile organic compounds (VOC) including carbonyls, additional measurements of gaseous nitrogen, such as NO_y, and meteorological measurements are routinely operated at PAMS. Because these measurements are not of criteria pollutants, the methods are not subject to the requirements for reference or equivalent methods. However, these methods are described in detail in the report, ''Technical Assistance Document (TAD) for Sampling and Analysis of Ozone Precursors.''[40]
- Special purpose monitoring (SPM) sites have no restrictions on the type of method to be utilized. While FRM and FEM can be employed at SPM sites, other methods, not limited to continuous, high-sensitivity, and passive methods, may also be utilized. Because SPM sites are designed to encourage monitoring, agencies are expected to design SPM sites with methods to meet specific monitoring objectives that may not be achievable with FRM or FEM. For instance, a community may be concerned with a source impacting their neighborhood. Because many PM FRMs are filter-based manual methods, having a 24-hour sample may not indicate if the source impacted the neighborhood because of the meteorological variability during the sample collection period. However, a continuous method may be able to provide the high-time resolution

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[40] Technical Assistance Document (TAD) for Sampling and Analysis of Ozone Precursors. U.S. Environmental Protection Agency. HUman Exposure and Atmospheric Sciences Division. EPA/600–R–98/161. September 1998. Available at: *http://www.epa.gov/ttn/amtic/pams.html.*

necessary to detect the short-term impacts of a plume on a neighborhood. Another example could be the utilization of passive monitors deployed at many locations to determine the location of maximum concentrations within a neighborhood. Additional information on SPM is included in section IV.E.9 of this preamble.

2. Approved Regional Methods for $PM_{2.5}$

The proposed amendments also expand the use of alternative $PM_{2.5}$ measurement methods through approved regional methods (ARM). The proposed amendments to 40 CFR part 58, appendix C extend the existing provisions for EPA approval of a nondesignated $PM_{2.5}$ method as a substitute for a FRM or FEM at a specific individual site to a network of sites. This approval would be extended on a network basis to allow for flexibility in operating a hybrid network of $PM_{2.5}$ FRM and continuous monitors. The size of the network, in which the ARM could be approved, would be based on the location of test sites operated during the testing of the candidate ARM. The proposed amendments require that test sites be located in urban and rural locations that characterize a wide range of aerosols expected across the network. A hybrid network of monitors would be operated to address monitoring objectives beyond just determining compliance with NAAQS. The hybrid network would lead to a reduced number of existing FRM samplers for direct comparison to NAAQS and an increase in continuous samplers that meet specified performance criteria related to their ability to produce sound comparisons to FRM data. Those ARM that meet the specified performance criteria would be approved for direct comparison to $PM_{2.5}$ NAAQS.

Performance criteria for approval of ARM would be used to determine whether the continuous measurements are sufficiently comparable for integration into the $PM_{2.5}$ network used in NAAQS decisions. These criteria are the same criteria for precision, correlation, and additive and multiplicative bias that are proposed for approval of continuous $PM_{2.5}$ Class III equivalent methods, described in section IV.B.3 of this preamble. These performance criteria would be demonstrated by monitoring agencies independently or in cooperation with instrument manufacturers under actual operational conditions using one to two FRM and one to two candidate monitors each. This would be a departure from the very tightly-controlled approach used for national equivalency demonstration in which three FRM and three candidate monitors are operated. The ARM would be validated periodically in recognition of changing aerosol composition and instrument performance. These validations would be performed on at least two levels: (1) Through yearly assessments of data quality provided for as part of the on-going quality assurance (QA) requirements in 40 CFR part 58, appendix A, and (2) through network assessments conducted at least every 5 years as described in section IV.E.11 of this preamble.

The testing criteria EPA is proposing for approval of $PM_{2.5}$ continuous methods as ARM are intended to be robust but not overly burdensome. The two main facets of testing are the duration and location(s) of testing. The duration is expected to be one year to provide understanding of the quality of the data on a seasonal basis. The locations for testing are expected to be a subset of sites in a network where the State desires the $PM_{2.5}$ continuous monitor to be approved as an ARM. Testing would be carried out in multiple locations to include up to two Core-based Statistical Area/Combined Statistical Areas (CBSA/CSA) and one rural area or small city for a new method. For methods that have already been approved by EPA in other networks, one CBSA/CSA and one rural area or small city would be required.

To ensure that approvals of new methods are made consistently on a national basis, the procedures for approval of methods would be similar to the requirements specified in 40 CFR part 53, i.e., the EPA Administrator (or delegated office) would approve the application. However, to optimize flexibility in the approval process, all other monitoring agencies seeking approval of a method that is already approved in another agency's monitoring network may seek approval through their own EPA Regional Administrator. This approach should provide a streamlined approval process, as well as an incentive for consistency in selection and operation of $PM_{2.5}$ continuous monitors across various monitoring agency networks.

The proposed QA requirements for approval of continuous $PM_{2.5}$ ARM at a network of sites would be the same as for FEM in 40 CFR part 58, appendix A, except that 30 percent of the required sites that utilize a $PM_{2.5}$ ARM would be collocated with an FRM and required to operate at a sample frequency of at least a one-in-six day schedule. The higher collocation requirement would support the main goal of the particulate matter continuous monitoring implementation plan, which is to have an optimized FRM and $PM_{2.5}$ continuous monitoring network that can serve several monitoring objectives. The current 15 percent collocation requirement in 40 CFR part 58, appendix A is adequate to provide an estimate of site and network precision; however, a higher amount of collocation is necessary to retain a minimum number of FRM for continued validation of the ARM, direct comparison to NAAQS, and for long-term trends that are consistent with the historical data set archived in the Air Quality System. The collocated sites are to be located at the highest concentration sites, starting with one site in each of the largest population CBSA or CSA in the network and working to the next highest-population CBSA or CSA with the second site and so forth.

E. What are the Proposed Requirements for the Number and Locations of Monitors To Be Operated by State and Local Agencies?

The proposed amendments modify the requirements in appendix D to 40 CFR part 58 for the number and locations of monitors necessary to support ambient air data objectives. This proposal requires States to deploy a new network of multipollutant monitoring stations called the National Core (NCore) network; requires States to maintain robust networks for $PM_{2.5}$ and ozone (O_3) and to establish a robust monitoring network for $PM_{10-2.5}$; allows States to make major reductions in monitoring for other criteria pollutants, where concentration data are well below the applicable National Ambient Air Quality Standards (NAAQS) and are not expected to pose future air quality problems; and allows States to reduce the number of stations required for the NCore photochemical assessment monitoring stations (PAMS) network. We also propose to establish or modify certain monitoring frequency requirements.

This proposal allows for reductions in air pollution monitoring for select pollutants in geographic areas that do not have or are not expected to have related air quality problems, while increasing or maintaining monitoring sites in areas with continuing or new air quality problems. The proposal allows for reductions in the carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), PM_{10}, and lead (Pb) air monitoring networks in geographic areas with historically low concentrations of these specific pollutants, except cases in which the State implementation plan (SIP) or source permits specifically require certain monitoring. However, monitoring requirements that are part of a SIP or permit should be revisited as part of the network assessments described in section IV.E.11 of this preamble. Overall, a limited number of these monitors are still expected, but not required, to be operated to support studies of air quality trends, to allow accountability for emissions control programs, and for health effects studies.

This proposal also requires States to increase or maintain monitoring sites in most areas with continuing or new air quality problems for O_3 and $PM_{2.5}$. However, with EPA agreement, States would be allowed to move some monitors to better characterize the spatial variability of these pollutants.

As discussed in section IV.E.2 of this preamble, we also are proposing requirements for the minimum monitoring network for the proposed $PM_{10\text{-}2.5}$ NAAQS published elsewhere in this **Federal Register**.[41]

Under the proposed monitoring amendments, the PAMS network would remain a requirement for serious, severe, and extreme ozone nonattainment areas. However, EPA is promoting the development of more individualized PAMS networks to suit the specific data needs for a PAMS area. We propose to make the PAMS requirements more flexible to allow for this redesign.

Minimum criteria pollutant monitoring requirements, where proposed for retention or addition, would be based in part on population statistics. The Office of Management and Budget (OMB) has established standards for defining metropolitan and micropolitan statistical areas that replace metropolitan statistical areas defined in the 1990 standards (65 FR 82227, December 27, 2000). The EPA has traditionally used the 1990 metropolitan statistical area definitions within many of the air monitoring requirements including the numbers of monitoring sites within a network and the Air Quality Index (AQI) reporting requirements. The proposed amendments use the new OMB standards for defining metropolitan and micropolitan areas, as well as the new standards for Core-based Statistical Areas (CBSA) and Combined Statistical Areas (CSA).

1. Proposed Requirements for Operation of Multipollutant Monitoring Stations Identified as the National Core Network (NCore).

The EPA is proposing requirements applicable to States individually that may, in the aggregate, cause the deployment of a new network of monitors in approximately 60 mostly urban multipollutant stations. Most States would be required to operate at least one urban station; however, rural stations could be substituted in States that have limited dense urban exposures. States with Core-Based Statistical Areas (CBSA) often also have multiple air sheds with unique characteristics and, often, elevated air pollution. These States include, at a minimum, California, Florida, Illinois, Michigan, New York, North Carolina, Ohio, Pennsylvania, and Texas. These States would be required to identify one to two additional NCore stations in order to account for their unique situations. These stations, combined with about 20 multipollutant rural stations, which are not specifically being required of the States, would form the new multipollutant NCore network. The rural NCore stations will be negotiated using grant authority as part of an overall design of the network that is expected to leverage existing rural networks such as IMPROVE, CASTNET and, in some cases, State-operated rural sites.

These multipollutant NCore stations are intended to track long-term trends for accountability of emissions control programs and health assessments that contribute to ongoing reviews of the NAAQS; support development of emissions control strategies through air quality model evaluation and other observational methods; support scientific studies ranging across technological, health, and atmospheric process disciplines; and support ecosystem assessments. Of course, these stations together with the more numerous $PM_{2.5}$ and O_3 sites would also provide data for use in the NAAQS decision making process and for public reporting and forecasting of the AQI.

The EPA proposes that these multipollutant NCore stations be required to measure O_3; high-sensitivity measurements, where appropriate, of CO, SO_2, and total reactive nitrogen (NO_y); $PM_{2.5}$ with both a Federal reference method (FRM) and a continuous monitor, $PM_{2.5}$ chemical speciation, and $PM_{10\text{-}2.5}$ with a continuous FEM; and meteorological measurements of temperature, wind speed, wind direction, and relative humidity. High-sensitivity measurements are necessary for CO, SO_2, and NO_y to adequately measure a signal for these pollutants in most air sheds for data purposes beyond NAAQS attainment determinations. For the other listed pollutants, conventional ambient air monitoring methods could be used.

At least one NCore station would be required in each State, unless a State determines through the network design process that a site which meets their obligation can be reasonably represented by a site in a second State, and the second State has committed to establishing and operating that site. Any State, local, or tribal agency could propose modifications to these requirements for approval by the Administrator. While the proposed amendments do not specify the cities in which the States must place their multipollutant NCore Level 2 monitoring stations, EPA anticipates that the overall result will be a network that has a diversity of locations to support the purposes listed earlier. For example, there would be sites with different levels and compositions of $PM_{2.5}$ and $PM_{10\text{-}2.5}$, allowing air quality strategies to be evaluated under a range of conditions.

These sites would be located in a manner that represents as large an area of relatively uniform land use and ambient air concentrations as possible (i.e., out of the area of influence of specific local sources, unless exposure to the local source(s) is typical of exposures across the urban area). Neighborhood-scale sites may be appropriate for multipollutant NCore monitoring stations in cases where the site is expected to be similar to many other neighborhood scale locations throughout the area. In some instances, State and local agencies may have a long-term record of several measurements at an existing location that deviates from the siting criteria in the proposed amendments. The State or local agency may propose utilizing these kinds of sites as the multipollutant NCore monitoring station to take advantage of that record. The EPA will approve these sites, considering both existing and expected new users of the data. The multipollutant NCore stations should be collocated, when appropriate, with other multipollutant air monitoring stations including PAMS, National Air Toxic Trends Station (NATTS) sites, and the $PM_{2.5}$ chemical Speciation Trends Network (STN) sites. Collocation would allow use of the same monitoring platform and equipment to meet the objectives of multiple programs where possible and advantageous.

The proposed amendments would require operation of the 60 NCore

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[41] Continuous $PM_{2.5}$ and $PM_{10\text{-}2.5}$ methods that can meet multiple monitoring objectives are being promoted by proposing new performance-based criteria for approval of these methods. See section IV.B of this preamble.

stations by January 1, 2011. However, up to 35 of these stations are already being operated on a voluntary and EPA-funded basis with acquisition of high-sensitivity monitors for CO, SO_2, and NO_y. These three new measurements and other existing measurements for O_3,$PM_{2.5}$, and meteorology are the foundation of this highly leveraged network. $PM_{10-2.5}$ measurements would also be added to these stations once the continuous technologies are approved as FEM and are commercially available.

Once these multipollutant NCore stations are established, it is EPA's intention that they operate for many years in their respective locations. Therefore, State and local agencies are encouraged to insure long-term accessability to the sites proposed for NCore monitoring stations. Relocating these stations would require EPA approval, which would be based on the data needs of the host State and other clients of the information.

We may negotiate with some States, and possibly with some Tribes, for the establishment and operation of some additional rural NCore multipollutant monitoring stations to complement the multipollutant stations that would be required by the proposed changes to the monitoring regulations. We are in the process of revising CASTNET to upgrade its monitoring capabilities to allow it to provide even more useful data to multiple data users. We expect that about 20 CASTNET sites will have new capabilities at least equivalent to the capabilities envisioned for NCore multipollutant sites. Those sites would reduce the number of, and complement, rural multipollutant sites funded with limited State/local grant funds.

2. Proposed Monitoring Requirements for the Proposed Primary National Ambient Air Quality Standard for $PM_{10-2.5}$

The EPA is proposing elsewhere in today's **Federal Register** a new primary standard for coarse particulate matter (PM), and a new indicator for that standard: $PM_{10-2.5}$, qualified so as to include any mix of $PM_{10-2.5}$ dominated by resuspended dust from high-density traffic on paved roads and PM generated by industrial sources and construction sources, and excludes any ambient mix of $PM_{10-2.5}$ that is dominated by rural windblown dust and soils and PM generated by agricultural and mining sources. See section III.D of the 40 CFR part 50 proposal.[42]

Accordingly, EPA is proposing new provisions in 40 CFR Part 58 to establish the minimum requirements for States to deploy and monitor for this proposed NAAQS. A main goal of the minimum required network will be the support of NAAQS designation decisions. Other data objectives include the improved characterization of the composition of coarse particles to support source apportionment studies and the development of control strategies; support of epidemiological and toxicological research efforts; public reporting of real-time concentration levels through the AQI and particle pollution forecasting programs; the quantification of coarse particle trends over time; and identifying and quantifying the factors that have contributed to changes over time for purposes of program accountability.

Requirements for monitor placement by States that are specific, for example requirements regarding the target distances of monitors from sources of concern, will also ensure a level of consistency in network design that allows monitoring results to be generally comparable among areas where minimum monitoring requirements apply.

This section begins with a discussion of the monitoring methods, types, and sampling frequencies to be used in the proposed network. We then turn to the description of the proposed minimum requirements for the $PM_{10-2.5}$ monitoring network including the proposed number of monitors to be required in affected areas and proposed requirements for where those monitors should be located within the areas. States would have the discretion (and would be encouraged) to place additional monitors to supplement these minimum required monitors.

Monitoring for an indicator described in qualified terms poses issues regarding how and when to determine the sites at which the ambient mix of $PM_{10-2.5}$ would be dominated by resuspended dust from high-density traffic on paved roads and PM generated by industrial sources and construction sources, and where it would not be dominated by rural windblown dust and soils and PM generated by agricultural and mining sources. The proposed new provisions for 40 CFR part 58 described in this section address this issue.

a. *Monitor type, methods, and frequency of sampling.*

We are proposing a Federal reference method (FRM) for $PM_{10-2.5}$ in a new appendix 0 to 40 CFR part 50 (Reference Method for the Determination of Coarse Particulate Matter in the Atmosphere), in section VI of the preamble to the Part 50 proposal elsewhere in this **Federal Register**. See also section IV.B above. The proposed FRM for measuring $PM_{10-2.5}$ is based on the combination of two conventional low-volume filter-based methods, one for measuring PM_{10} and the other for measuring $PM_{2.5}$, and determining the $PM_{10-2.5}$ measurement by subtracting the $PM_{2.5}$ measurement from the concurrent PM_{10} measurement.[43]

The new filter-based FRM would not be required to be widely deployed in the operational $PM_{10-2.5}$ network, but rather would serve as the basis of comparison for the equivalency procedures in 40 CFR part 53 described in section IV.B of this preamble. The EPA intends (but would not require) that the majority of the monitors comprising the $PM_{10-2.5}$ network be based on continuous methods that will provide an hourly

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[42] As explained in section III of the NAAQS proposal (published elsewhere in this **Federal Register**), the focus on coarse particles associated with these source types is derived from the available epidemiological studies that examined exposures to the ambient mix of $PM_{10-2.5}$ in urban areas, and the study which examined exposure to unenriched natural crustal materials, as well as dosimetric evidence and toxicological studies. Adverse health effects associated with $PM_{10-2.5}$ concentrations have been noted in studies conducted in urban areas, while limited evidence does not support the association of health effects with $PM_{10-2.5}$ concentrations resulting from the suspension by wind of uncontaminated natural crustal materials of geologic origin. Furthermore, available evidence does not support either the existence or the lack of causative associations for community exposures to coarse particle emissions from agricultural or mining sources.

[43] As noted in section VI.A.5 ''Relationship of Proposed FRM to Section 6012 of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA–LU) (PL 109–59)'' of the part 50 NAAQS proposal, section 6012 of SAFETEA–LU requires the Administrator to ''develop a Federal reference method to measure directly particles that are larger than 2.5 micrometers in diameter without reliance on subtracting from coarse particle measurements those particles that are equal to or smaller than 2.5 micrometers in diameter.''

As explained above in section IV.B of this preamble and in the NAAQS proposal, EPA, consistent with Clean Air Scientific Advisory Committee (CASAC) Peer Review and recommendation, is proposing a difference method as the Federal reference method (FRM). We are doing so because other methods are not yet sufficiently developed to serve as an FRM. We have further explained, however, that we believe that other methods, notably certain types of continuous monitoring and dichotomous methods, are potential Federal equivalent methods, and indeed, that we expect actual monitoring networks to utilize these other means of monitoring. We are also continuing to investigate the possibility of promulgating the dichotomous method as an FRM, and if technically justified, will do so.

We view these actions as consistent with the new statutory provisions. We are taking the steps necessary to develop a compliance network using non-difference, continuous methods as the principal means of monitoring for $PM_{10-2.5}$. We are further devoting substantial effort to the possibility of promulgating dichotomous methods as an alternative FRM. The EPA will also submit the required reports by August 10, 2007, the deadline specified by SAFETEA–LU.

time resolution. At sites with locally measured wind data and continuous $PM_{10-2.5}$ monitors, hourly time resolution will help States and EPA understand the emission sources that are most important to control, by relating wind direction and source locations in particular hours with peaks, and/or by matching the hourly pattern of concentrations with known temporal patterns of sources such as traffic. It may also, in some cases, help in understanding whether natural events have influenced a day's 24-hour concentration. Whatever method a State chooses to deploy, all $PM_{10-2.5}$ monitors counted by a State as part of its compliance with the required minimum number of $PM_{10-2.5}$ monitoring sites (proposed below) would be required to sample every day. The EPA's data quality objective process has found daily sampling to be a key factor in reducing statistical uncertainty at concentration levels near the proposed daily $PM_{10-2.5}$ NAAQS. The automation inherent in continuous methods would provide a more cost-effective alternative to manual filter-based sampling for achieving this daily sampling frequency.

The EPA is proposing January 1, 2009, as the deadline for deployment of $PM_{10-2.5}$ monitors. This will provide over 2 years from promulgation of the final rule for one or more continuous $PM_{10-2.5}$ monitors to be approved by EPA as meeting the proposed Class III FEM requirements in 40 CFR part 53 and for the States to procure and deploy those instruments. We believe this will be sufficient time for the steps that are required by monitor vendors, EPA, and the States. At least two monitor vendors have already developed prototype continuous instruments expected to be candidates for approval as equivalent methods. These prototypes have already been the subject of field trials in cooperation with EPA. We expect vendors to make improvements based on this field experience so that final designs can be field tested in the winter of 2006/2007, after promulgation of the final rule, and in the summer of 2007. Under 40 CFR section 53.5, the Administrator has up to 120 days to act on equivalency applications. Thus, it is feasible for applications to be submitted and EPA to approve one or more applications in late 2007 or early 2008 and for States (or EPA on behalf of States) to place orders in time for monitors to be manufactured, shipped, and installed by January 1, 2009.

A small percentage of continuous $PM_{10-2.5}$ samplers (minimum of 15 percent) would be required to have a collocated filter-based FRM sampler or collocated continuous FEM monitor at the same site for QA purposes (see proposed 40 CFR part 58, appendix A, Quality Assurance Requirements for SLAMS, NCore, and Prevention of Significant Deterioration (PSD) Air Monitoring. While we have determined that all of the $PM_{10-2.5}$ monitors should be of the continuous type, except for these collocated FRM samplers, we are not requiring the sole use of continuous methods, in order to maintain flexibility in the use of manual sampling technology that can meet the proposed $PM_{10-2.5}$ FRM or FEM requirements, and potentially address additional goals such as speciation.

We have considered the issue of whether a State should be allowed to operate an appropriately sited PM_{10} monitor in lieu of a required $PM_{10-2.5}$ monitor in a situation in which the probability of a $PM_{10-2.5}$ NAAQS violation is small. Some State monitoring officials have expressed interest in such an option to save resources or to spread the need for monitor investments over time.[44] We expect that in the types of areas where $PM_{10-2.5}$ is dominated by emissions generated from high density traffic on paved roads, industrial sources, and construction activity, a substantial fraction of PM_{10} is likely to be $PM_{2.5}$. While a PM_{10} monitor will capture this $PM_{2.5}$ and thus would provide a conservative estimate (i.e., an overestimate) of $PM_{10-2.5}$ concentrations, there are complicating considerations.

Without data from FRM or FEM $PM_{10-2.5}$ monitors, an area would be initially designated unclassifiable for $PM_{10-2.5}$.[45] Some designated PM_{10} FRM instruments have relatively poor precision compared to the proposed requirements for the $PM_{10-2.5}$ FRM and FEMs. It is possible that an area might appear to meet the $PM_{10-2.5}$ NAAQS based on PM_{10} monitor readings but actually not be in compliance. It is also possible that a PM_{10} monitor might unexpectedly indicate a high enough concentration of PM_{10} as to suggest a possible violation of the $PM_{10-2.5}$ NAAQS. In such a situation, the result could be a delay in efforts to meet the $PM_{10-2.5}$ NAAQS relative to what would have been the case had an approved FRM or FEM $PM_{10-2.5}$ monitor been deployed initially.

On balance, EPA believes it is appropriate to allow use of any PM_{10} FRM or FEM monitor in lieu of a required $PM_{10-2.5}$ monitor, with restrictions, including the requirement for daily sampling at such PM_{10} monitors. This could only be initiated at monitoring sites where the 98th percentile value for the most recent complete calendar year of PM_{10} monitoring data[46], reported at local conditions of temperature and pressure as specified for $PM_{10-2.5}$, is less than the proposed $PM_{10-2.5}$ NAAQS.[47] During any calendar year of PM_{10} sampling in lieu of a required $PM_{10-2.5}$ sampler, if more than seven 24-hour average PM_{10} concentrations exceed the numerical value of the proposed $PM_{10-2.5}$ NAAQS, the State would have to deploy a FRM or FEM $PM_{10-2.5}$ monitor within a one year period. We invite comment on this subject, including other possible provisions for more limited use of PM_{10} monitors in lieu of $PM_{10-2.5}$ monitors, such as limiting the use of PM_{10} monitors to a period of 3 years after the first approval of a continuous FEM $PM_{10-2.5}$ method.

b. *Network design.*

i. Number of required monitors. The discussion of network design requirements for $PM_{10-2.5}$ begins with the questions of how to define the geographic units which should be separately subject to minimum monitoring requirements and how many monitors should be required in each such area. We propose that the geographic unit for individual application of monitoring requirements be the Metropolitan Statistical Area (MSA) (i.e., a CBSA which contains an urbanized area with a population of at least 50,000 persons).[48] We also propose that only those MSAs that contain all or part of an urbanized area with a population of at least 100,000 or more be required to have monitors.

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[44] The Clean Air Scientific Advisory Committee (CASAC) also supported this concept, although without explicit discussion of the complicating implementation considerations discussed here.

[45] An area without a $PM_{10-2.5}$ monitor could in concept be included in an adjacent nonattainment area because of its contribution to concentrations in the latter area. Given the typically short transport distance of $PM_{10-2.5}$, this would be unusual.

[46] PM_{10} data used to qualify a site for PM_{10} monitoring in place of $PM_{10-2.5}$ monitoring must be based on a 1-in-3 day sampling frequency, or more frequent sampling.

[47] The EPA's intention regarding the substitution of PM_{10} monitors for required $PM_{10-2.5}$ monitors is that siting criteria would not be affected, i.e., the PM_{10} monitor that will substitute for a $PM_{10-2.5}$ monitor would have to be located at a site that would be appropriate for a required $PM_{10-2.5}$ monitor. (What sites are appropriate for required $PM_{10-2.5}$ monitors is addressed below.) Also, PM_{10} data used to qualify a site for PM_{10} monitoring in place of $PM_{10-2.5}$ monitoring must also be from—or clearly representative of—the site where a PM_{10} monitor will substitute for a $PM_{10-2.5}$ monitor.

[48] Defined metropolitan and micropolitan statistical areas based on application of 2000 standards (which appeared in the **Federal Register** on December 27, 2000) to 2000 decennial census data. *http://www.census.gov/population/www/estimates/00–32997.txt.*

Some MSAs contain multiple urbanized areas with populations of 100,000 people or more, each containing emission sources of interest for $PM_{10-2.5}$, which could be separately subject to monitoring requirements; however, we believe applying minimums at the urbanized area level is not necessary to support implementation of the proposed NAAQS.[49] Where more than one MSA is part of a Combined Statistical Area (CSA), each MSA would be treated separately. We believe separate treatment of MSAs is appropriate in light of the typically short transport distance of $PM_{10-2.5}$ and the diversity of situations that can exist in a CSA. For comparison, $PM_{2.5}$ and O_3 monitoring, minimum requirements apply at the CSA level, because a broader geographic frame is appropriate for those photochemically formed pollutants.

Consistent with both the current State and Local Air Monitoring Station (SLAMS) minimum requirements for $PM_{2.5}$ described in 40 CFR part 58, appendix D and the proposed minimum requirements for $PM_{2.5}$ described in section IV.E.3 of this preamble, EPA proposes that States be required to have more $PM_{10-2.5}$ monitors in higher-population MSA than in lower-population MSA. A higher-population MSA typically has more total roadway surface, higher traffic counts, more and larger industrial sources, and more ongoing construction at any given time, all of which make it more likely that the MSA contains more locations with high concentrations of coarse particles attributable to these sources. Also, a higher-population MSA potentially contains more distinct types of emissions situations causing $PM_{10-2.5}$ nonattainment, *i.e.*, more distinct mixes of emission sources affecting different locations, such that separate monitoring may be needed to identify these and to develop and track the success of control strategies for them. More monitors will also be useful in helping to define nonattainment boundaries in larger and potentially more complex MSAs. Accordingly, we are proposing minimum requirements for the number of $PM_{10-2.5}$ monitoring stations in each MSA based, in part, on the total population of the MSA.[50]

We are proposing that the actual or estimated $PM_{10-2.5}$ design value (three-year average of 98th percentile 24-hour concentrations) of an MSA, where one can be calculated, be used as a second factor to increase the minimum number of monitors in MSA with higher estimated ambient coarse particle levels and to reduce requirements in MSA with lower estimated levels. Given the imprecision of current estimates of $PM_{10-2.5}$ ambient concentrations and the resulting non-robust design value statistics that will initially be available to States when they develop their monitoring plans, we are proposing three categories of design values defined by percentages of the proposed 24-hour $PM_{10-2.5}$ NAAQS. The proposed amendments categorize MSA design values as either low (less than 50 percent of the proposed $PM_{10-2.5}$ NAAQS), medium (50 percent to 80 percent), or high (greater than 80 percent).

The EPA will assist States with the development of $PM_{10-2.5}$ design values by analyzing the concentrations from existing collocated or nearly collocated PM_{10} and $PM_{2.5}$ monitors in each MSA and identifying which pairs meet the proposed siting criteria appropriate for comparison to the proposed $PM_{10-2.5}$ NAAQS. Monitoring agencies may propose other procedures for calculating estimated $PM_{10-2.5}$ design values as a substitute for EPA-calculated values, subject to Regional Office approval of the monitoring methods, site characteristics, and data handling procedures being used to calculate substitute estimated design values. $PM_{10-2.5}$ design values for purposes of determining the number of required monitors would be calculated using data only from sites which are suitable for comparison to the NAAQS under the criteria presented later in this section. If no such sites exist, medium area MSA minimum requirements would apply. After actual data using FRM or FEM monitors is available to establish a true design value based on 3 years of data, a State would be allowed to reduce or be required to increase the number of monitors based on that design value. This process of adjustment would be ongoing, and would be a specific aspect of the periodic network assessment that would be required by the proposed amendments.

Table 1 of this preamble presents the specifics of the proposed requirements for the minimum number of monitors in an MSA, relating the minimum number of $PM_{10-2.5}$ monitors to total MSA population and design value. For example, an MSA with a total population of between 1 million and 5 million people that contains all or part of an urbanized area with a population of at least 100,000 people, with an actual or estimated $PM_{10-2.5}$ design value of between 50 percent and 80 percent of the proposed $PM_{10-2.5}$ NAAQS would be required to have at least two monitors. In another example, an MSA with a total population between 100,000 and 500,000 people with an actual or estimated $PM_{10-2.5}$ design value of less than 50 percent of the proposed $PM_{10-2.5}$ NAAQS would not be required to have any monitors, although States could deploy discretionary monitors.

We invite comment on whether there should be a different minimum size for an MSA required to have monitors, rather than applying the criteria in Table 1 of this preamble to all MSA that contain all or part of an urbanized area with a population of at least 100,000 persons. We also invite comment on whether factors in addition to MSA population and estimated design value should enter into the determination of the number of required monitors, for example, MSA or urbanized area(s) population density, and if so, in what way.

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[49] Factors which contribute to this assessment include the consideration that multiple urbanized areas in a single Metropolitan statistical area (MSA) will tend to have similar situations affecting $PM_{10-2.5}$ concentrations, for example similar meteorological conditions which can favor or suppress emissions of $PM_{10-2.5}$ from paved roadways and construction sites. Also, applying monitoring requirements separately to urbanized areas would both increase the total number of required monitors and reduce State flexibility in siting the required monitors since any requirements would have to be met separately in each urbanized area.

[50] April 1, 2000 population in Metropolitan and Micropolitan Statistical Areas in Alphabetical Order and Numerical and Percent Change for the United States and Puerto Rico: 1990 and 2000, Source: U.S. Census Bureau, Census 2000 and 1990 Census. Internet Release date: December 30, 2003. *http://www.census.gov/population/cen2000/phc-t29/tab01a.xls.*

TABLE 1.—$PM_{10-2.5}$ MINIMUM MONITORING REQUIREMENTS

MSA total population [1] [5]	Most recent 3-year design value [2] >80% of $PM_{10-2.5}$ NAAQS [3]	Most recent 3-year design value 50%–80% of $PM_{10-2.5}$ NAAQS [3] [4]	Most recent 3-year design value <50% of $PM_{10-2.5}$ NAAQS [3]
> 5,000,000	5	3	2
1,000,000–<5,000,000	4	2	1
500,000–<1,000,000	3	1	0
100,000–<500,000	2	1	0

[1] Metropolitan Statistical Area (MSA) as defined by the Office of Management of Budget. The requirements of this table apply only to MSAs that contain all or part of an urbanized area with a population of at least 100,000 persons. Metropolitan and micropolitan statistical areas based on application of 2000 standards (which appeared in the **Federal Register** on December 27, 2000) to 2000 decennial census data.

[2] A database of estimated $PM_{10-2.5}$ design values will be provided by EPA until the network is fully deployed for 3 years.

[3] The proposed $PM_{10-2.5}$ National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR part 50.

[4] These minimum monitoring requirements would apply in the absence of a design value.

[5] Population based on latest available census figures.

The EPA estimates that the size of the minimum required $PM_{10-2.5}$ network will be approximately 250 monitors based on the proposed requirements and our current estimates of $PM_{10-2.5}$ design values. Figure 1 of this preamble illustrates our current estimates of how many monitors would be required in each MSA based on the criteria in Table 1, census data on MSA populations, and current estimates of design value.[51] We are not proposing a specific number of monitors for any MSA. The actual initial number of monitors required in a given MSA and the initial size of the minimum required national network may be different if monitoring agencies propose and we approve alternate approaches to estimating design values for this purpose. It may be that later review by States may determine that one or more of the PM_{10} monitors we have used to estimate $PM_{10-2.5}$ design values is not appropriate. Also, consideration of exceptional events may be appropriate and may affect estimated design values. The size of the required network may vary after its startup depending on long-term changes in total MSA population and design values.

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[51] A document listing the current estimate of $PM_{10-2.5}$ design values used in constructing figure 1 of this preamble is available in the docket.

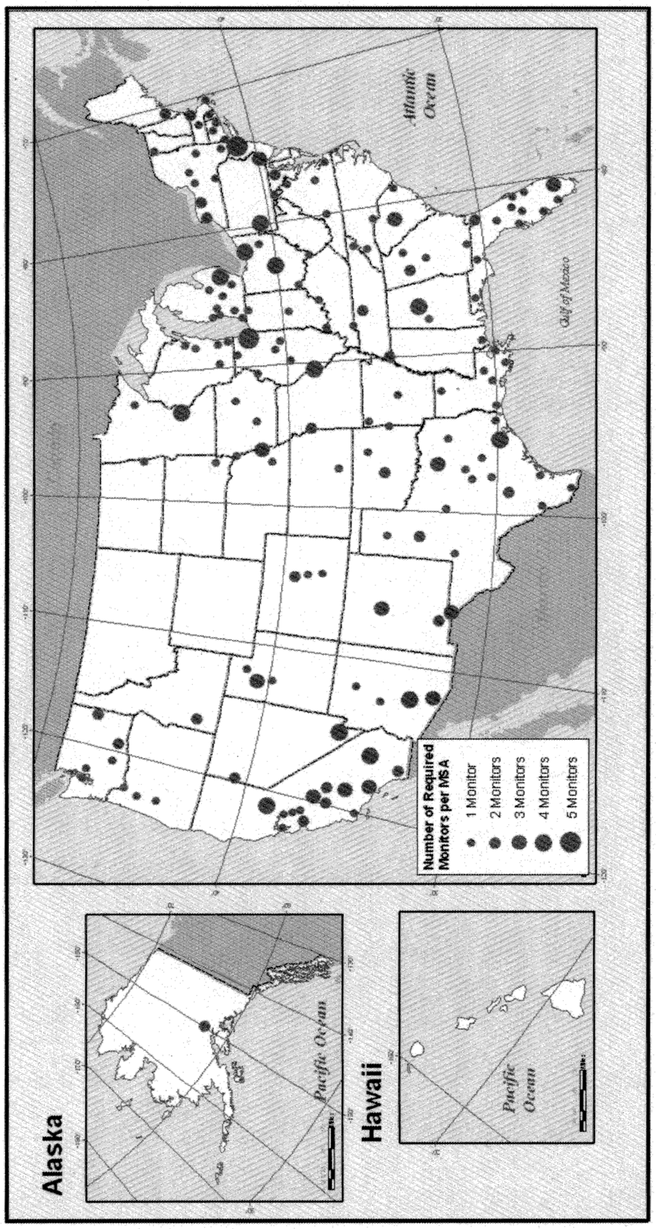

Figure 1. Illustration of Monitors That Could Be Required by the Proposed Requirements Listed in Table 1. The circles, which are sized to indicate the number of required monitors, appear at the centroid of MSA and do not imply the actual placement of any of the required monitors at particular locations within the MSA.

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Figure 1 of this preamble shows that the proposed minimum network criteria could (depending on estimated design values as of the time the States develop their monitor siting plans) have the effect of putting relatively more monitors in the eastern States than in western States. This occurs in part because of currently estimated design values but also in part because there are so many individual MSA in eastern States compared to western States. In western States, there are fewer small and medium-sized cities which are in separate MSA and thus qualify for separate monitoring under the proposed criteria, because the larger size of counties in the western States means that many smaller cities are subsumed within relatively few MSA.

We request comment on whether the proposed minimum requirements appropriately address the need for monitoring data in both eastern and western States, whether additional or fewer monitors could be needed, and whether additional monitors in some areas, if needed, should be required by the regulations or deployed through collaborative planning and grant support. A possibility on which we request comment is to not adhere to the formal county-based definition of MSA in the West and in some way to require separate monitoring of more urbanized areas that are not distinct MSA and, therefore, would not be separately subject to the minimum monitoring requirements as proposed. For example, some MSA in some western states are divided into distinct nonattainment areas for ozone, reflecting natural barriers to transport between air basins. This division or similar divisions of a large MSA in a western state could perhaps play a role in determining which population centers should require separate monitoring for $PM_{10-2.5}$. We also request comment on approaches that would aggregate officially distinct MSAs in eastern States for the purpose of determining the required number of monitors.

ii. *Location of required monitors and comparability to the NAAQS.* We now turn to the criteria that should be used to locate required monitoring sites within an MSA (the number of monitors to be sited being determined by the total MSA population and estimated design value criteria as just described). As stated in the introduction to this section, a main goal of the minimum required monitors in a given MSA will be to support NAAQS designation decisions, including decisions on nonattainment area boundaries. As detailed in the NAAQS proposal also in today's **Federal Register**, the purpose of the proposed qualified coarse particle indicator and standard is to protect against coarse particle mixes that are likely to be similar to those present in the urban epidemiological studies upon which the proposed standard is based. The indicator for the NAAQS includes any ambient mix of $PM_{10-2.5}$ that is dominated by resuspended dust from high-density traffic on paved roads and PM generated by industrial sources and construction sources, and excludes any ambient mix of $PM_{10-2.5}$ that is dominated by rural windblown dust and soils and PM generated by agricultural and mining sources. In order to implement the proposed standard, it is necessary to separate where the mix is dominated by the emissions of PM from listed sources and where it is not. We have been mindful of this goal in developing the following proposals regarding monitor siting. In particular we have been mindful that the strategy for locating $PM_{10-2.5}$ monitors must be developed in light of the qualified indicator for the NAAQS. Monitors should therefore be placed in locations where concentrations of $PM_{10-2.5}$ are dominated by PM emissions generated from high density traffic on paved roads, industrial sources, and construction activities.

We have also been mindful that the strategy for locating $PM_{10-2.5}$ monitors must be developed in light of the approach used to set the level of the proposed $PM_{10-2.5}$ NAAQS. As explained in the NAAQS proposal notice elsewhere in today's **Federal Register**, the proposed level of 70 $\mu g/m^3$ for $PM_{10-2.5}$ (98th percentile form) was selected to be of equivalent stringency to the current 24-hour PM_{10} NAAQS of 150 $\mu g/m^3$ (one-expected exceedance form). As discussed below, the approach used to determine that these levels are equivalent in stringency has implications for $PM_{10-2.5}$ monitor placement.

The EPA recognizes that each MSA will be characterized by a unique mix of moderate to highly populated areas together with unique arrangements of paved roads, areas of construction, and industrial sources of coarse particles. Therefore, we are proposing network design requirements that leave room for later agreement between EPA and each State on specific sites but that provide the binding principles for those agreements.

We envision that a typical $PM_{10-2.5}$ monitoring network in a large MSA would include some sites with heavy impacts from PM emissions generated from highly traveled roadways and/or major industrial sources, but with a relatively small exposed population because the area around the site is not a dense residential or commercial area, and some sites in densely populated areas with somewhat less proximity to such sources. It could also include some sites in lower-density suburban-type population areas that are nonetheless affected by sources with emissions of concern. Within each of these three categories of sites, there are some sites that are not suitable for required monitors because the sites have a good possibility of not being dominated by PM emissions generated from high density traffic on paved roads, industrial sources, and construction activities, or because placement of monitors for comparison to the NAAQS in those locations would be inconsistent with the intended stringency of the NAAQS. The following proposal addresses both how the required number of monitors should be assigned to the three categories of sites, and what types of sites are suitable or unsuitable for placement of monitors.

We are proposing a five-part test of whether a potential monitoring site is suitable for comparison to the NAAQS, and two rules for how required monitors should be assigned among such suitable sites. All five parts of the suitability test must be met. The suitability test also would be used to determine whether non-required or special purpose monitors are suitable for comparison with the proposed $PM_{10-2.5}$ NAAQS.

The first two parts of the five-part suitability test are based on using readily available Census data to help ensure that $PM_{10-2.5}$ monitoring sites are located near and will be dominated by PM emissions from paved roads, construction, and industrial sources. The first part is that a monitoring site must be within a U.S. Census Bureau-defined urbanized area that has a population of at least 100,000 persons. Restricting suitable sites to only those within an urbanized area of this size increases the likelihood that the ambient mix of $PM_{10-2.5}$ will be dominated by resuspended dust from high-density traffic on paved roads and PM generated by industrial sources and construction sources, rather than rural windblown dust and soils and PM generated by agricultural and mining sources which are more typical of rural areas.

The second part of the suitability test is a minimum threshold for the population density of the block group containing the monitoring site. This provides more assurance that resuspended dust from high-density traffic on paved roads and PM generated by industrial sources and construction sources will dominate in the vicinity of the monitoring site.

We propose to employ population density in addition to simple presence within an urbanized area because population density is highly correlated to traffic density and is available on a relevant geographic scale. It is appropriate to expect that mixes of $PM_{10-2.5}$ monitored at sites located in areas of sufficiently high population density are dominated by resuspended dust from high-density traffic on paved roads and PM generated by industrial sources and construction sources.

Accordingly, we have based the proposed suitability test for a candidate monitoring site on the population density of the census block group in which the site is located. There is a strong correlation of county-level estimates of Vehicle Miles Traveled (VMT) density with county-based population density.[52] It is reasonable to presume that this county-level correlation indicates an association between population density and vehicular traffic and resulting emissions of resuspended dust at smaller geographic scales also, although exceptions to the association no doubt become more common. To a lesser extent, there may also be associations between population density and the presence of other industrial sources and construction activities.[53] It is thus appropriate to expect that mixes of $PM_{10-2.5}$ monitored at sites located in areas of sufficiently high population density are dominated by resuspended dust from high-density traffic on paved roads and PM generated by industrial sources and construction sources, and are not dominated by rural windblown dust and soils and PM generated by agricultural and mining sources.

The available census geographic entities for which population density is published by the U.S. Census are counties, urbanized areas, urban clusters, census tracts, and block groups. Block groups typically encompass one-half to two square miles, and thus they provide a spatial resolution of about one mile. On average, there are approximately 200 block groups for each of the 370 MSA in the U.S. In a State such as Michigan, for example, the average land area in a county is 700 square miles as compared to just over 20 square miles for a census tract and to about 0.5 square miles for a block group. A large-scale unit of density analysis, say the urbanized area level, would not be as helpful for guiding monitor placement since it would be a mix of low and high density sub-units that could have quite different source mixes.

We considered a range of block group population density thresholds for use in identifying block groups within an urbanized area that may be suitable for comparison to the NAAQS, depending on other parts of the suitability test. A low population density threshold would tend to identify as suitable low density ''edge'' block groups, which because of their proximity to surrounding non-urbanized lands could tend to have $PM_{10-2.5}$ concentrations that are from emission sources that are not of concern, as these are explicitly rural sources (windblown rural dust and soil) or sources that are more typical in rural lands (agriculture and mining). A low population density threshold would also tend to identify internal or ''enclave'' low density block groups which may well have significant paved road, industrial, and construction emission sources but happen not to have many residences; later we return to such ''enclave'' block groups as an exceptional case. A population density threshold that is too high could leave out areas where $PM_{10-2.5}$ concentrations are dominated by PM emissions from high density traffic on paved roads, industrial sources, and construction activities.

We first noted that the U.S. Census Bureau uses a population density of 500 persons per square mile in one step of defining the ''Initial Core'' of an urbanized area. The initial core of an urbanized area always includes core census block groups or blocks with a density of at least 1,000 persons per square mile and contiguous block groups that have a density of at least 500 persons per square mile.[54]

We have investigated for comparison the population densities of block groups in which States and EPA have agreed in the past to place PM_{10} monitors. We observe that States have typically located PM_{10} monitors in block groups of population densities that are higher than 500 people per square mile. The median block group population density of the approximately 1,200 PM_{10} monitoring sites active in the U.S. between 2002 and 2004 is 1,390 people per square mile. Sixty-three percent of the approximately 1,200 PM_{10} monitoring sites are in block groups with a density higher than 500 persons per square mile.

We have also investigated for comparison the block group population densities for those PM_{10} monitors which are sited with or near a $PM_{2.5}$ monitor. The $PM_{2.5}$ monitoring program was set up to be more urban oriented than the PM_{10} monitoring program. Thus, this smaller set is of more relevance to the structure of a $PM_{10-2.5}$ monitoring program. Among the 710 such monitors, the median block group density is 2,306 persons per square mile. Seventy-eight percent of the 710 monitoring sites are in block groups with a density higher than 500 persons per square mile.

After examining on an empirical basis in a sampling of MSA the block groups identified by population density thresholds of 500 persons per square mile, values lower than 500, and values above 500, and in light of the practices of the U.S. Census Bureau, we selected 500 as the proposed threshold value for the second part of the suitability test because it appears to result in inclusion of most of the related urbanized area while omitting fringe areas where paved roads, construction sites, and industrial sources are few in number and/or low in emissions mass, and whose emissions and ambient impact could be exceeded by the impact of rural soil, dust, and emissions from agricultural and mining sources.

Regarding the above-mentioned issue of enclaves within an urbanized area, we are concerned not to exclude low population density block groups that contain paved roads, construction sites, and/or industrial sources and do not contain significant agricultural or mining sources. The Census incorporates enclaves consisting of block groups with population density below 500 persons per square mile if certain conditions are satisfied. Enclaves of less than five square miles are always incorporated. Even larger enclaves can be included as well. We are concerned that such large enclaves may not be industrial zones or transportation corridors that happen to have little resident population (which could be appropriate for monitoring) but instead could contain agricultural or mining operations (which could make them inappropriate for monitoring). Therefore, we propose that block group(s) with population densities less than 500 persons per square mile, even if part of an urbanized area, will be considered to pass the second part of the suitability test if those block groups comprise an enclave of less than five square miles in land area. We invite comment on this special exception.

We propose that the third necessary condition for siting a required monitor and comparing any $PM_{10-2.5}$ monitor to the $PM_{10-2.5}$ NAAQS be that the monitor be population-oriented. The term

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[52] Review of the National Ambient Air Quality Standards for Particulate Matter: Policy Assessment of Scientific and Technical Information, OAQPS Staff Paper, EPA–452/R–05–005, June 2005, p. 5–59. Counties are the geographic unit at which vehicle miles traveled (VMT) is most readily available from State departments of transportation. The Federal Highway Administration maintains VMT statistics at a higher level of aggregation.

[53] Manufacturing and service industry facilities, and areas of long-term construction such as commercial development and roadway construction, tend—with exceptions—to be in the general area of populated areas that create the demand for such activities and provide their workers.

[54] See Urban Area Criteria for Census 2000, March 15, 2002, 51 FR 11663. The Census Bureau adds to each urbanized area additional non-contiguous block groups below and above 500 persons per square mile using detailed ''hop'' and ''jump'' criteria. Any additional block groups below 500 persons per square mile would not be included in our proposed suitability test because such areas are less likely to have a dense concentration of paved roads, construction, and industrial sources and may be in close proximity to sources of emissions that are not of concern.

''population-oriented sites'' is presently defined in 40 CFR 58.1 as sites in residential areas, recreational areas, industrial areas, and other areas where a substantial number of people may spend a significant fraction of their day.[55] The concept plays an important role in the $PM_{2.5}$ monitoring network in that a $PM_{2.5}$ monitor must be population-oriented to be appropriate for comparison to either the annual or 24-hour $PM_{2.5}$ NAAQS. We believe that this restriction is also appropriate for $PM_{10-2.5}$ for the same reasons as for $PM_{2.5}$.

The fourth part of the five-part suitability test is a restriction against monitoring sites that are adjacent to a large emissions source or otherwise within the micro scale environment affected by a large source.[56] This restriction is intended to help ensure that monitor siting is consistent with the intended stringency of the proposed NAAQS. The relatively large size of coarse particles and resulting high rate of deposition under most weather conditions, and the fact that nearly all coarse particles are primary[57], mean that the ambient concentration of $PM_{10-2.5}$ measured in a specific location will be more dependent on the distance of that monitor from coarse particle sources than would typically be the case for ambient $PM_{2.5}$ and associated sources of fine particles.[58] Monitors placed adjacent to coarse particle sources would typically measure higher ambient concentrations than monitors placed farther away. A $PM_{10-2.5}$ monitoring site located adjacent to a high emitting industrial source or a heavily traveled highway, for example, might measure high ambient concentrations, but these concentrations could be characteristic only of the relatively small area around the monitor, notably a smaller area than in the case of a similarly sited $PM_{2.5}$ monitor. Even if there are people living or working at the monitor site, thus qualifying it as population-oriented, applying the proposed NAAQS level to the concentration level measured at such a monitor would be inconsistent with the level of community protection intended through the proposed NAAQS. As explained in section III.G of the NAAQS preamble, the EPA intends that the proposed 24-hour $PM_{10-2.5}$ NAAQS be equivalent in stringency to the current 24-hour PM_{10} NAAQS. In determining the level for the $PM_{10-2.5}$ NAAQS that would achieve this equivalency, we relied on the relationship between $PM_{10-2.5}$ and PM_{10} observed at PM_{10} monitoring sites all or most of which were not adjacent to large emission sources. If $PM_{10-2.5}$ monitors were placed at sites that are adjacent to emission sources, the effect would be to make the proposed NAAQS less community-oriented and more stringent than intended. The EPA therefore believes it is appropriate to have a restriction that $PM_{10-2.5}$ monitors in source-influenced micro-environments, such as on facility fence lines or along the edge of traffic lanes, are not appropriate for comparison to the NAAQS even if there is some population subject to exposure in that location (even if EPA or the State believes that there are other micro-environments similarly affected by other sources of the same type). $PM_{10-2.5}$ monitors placed in such micro environment-types of situations thus would not be eligible for comparison to the NAAQS[59] and would not count toward meeting minimum EPA monitoring requirements.

The fifth part of the suitability test, which would only need to be considered for sites that satisfy all of the first four parts, is that a site-specific assessment shows that the ambient mix of $PM_{10-2.5}$ sampled at that site would be dominated by resuspended dust from high-density traffic on paved roads and PM generated by industrial sources and construction sources, and would not be dominated by rural windblown dust and soils and PM generated by agricultural and mining sources. The first four parts of the suitability test make it unlikely that a candidate site would be dominated by rural windblown dust (other than perhaps during exceptional events), but the site-specific assessment may determine otherwise. The site-specific assessment may also reveal the presence of a dominant agricultural or mining operation, for example, a gravel or sand extraction and material handling operation.

As an example of how this five-part suitability test would work, consider the Riverside-San Bernardino-Ontario, California MSA. The first part of the test excludes any site outside the Census-designated urbanized areas within the MSA, of which there are several. The second part of the test would indicate that a monitoring site within a certain boundary around the densest parts of the Riverside-San Bernardino urbanized area, the Indio-Cathedral City-Palm Springs urbanized area, or any of the other urbanized areas in the MSA that have a population of at least 100,000 persons, is possibly suitable for comparison with the NAAQS, while a monitoring site in the small Yucca Valley urban cluster would definitely not be suitable. Each boundary would follow block group borders, and would leave out less dense parts of its associated urbanized area. The third part of the test (population-orientation) would disqualify some sites within these boundaries because of the small number of people subject to exposure in the vicinity that has concentrations similar to what would be monitored at the site. The fourth part would disqualify sites adjacent to major roadways (a source-influenced microenvironment). The fifth part would assess the remaining candidate sites to verify that they are not exposed to windblown rural dust and soils or PM generated by agriculture and mining sources to such an extent that emissions from those sources would dominate the mix of $PM_{10-2.5}$ sampled at that site.

We invite comment on possible variations of the proposed test for suitability for comparison to the NAAQS, for example the use of census tracts in place of block groups or different values for population density or total population of a aggregation of block groups or tract groups. Census

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[55] Population density of a block group and population-orientation of a monitoring site are distinct concepts. A monitoring site may not be population-oriented even though it is within a block group of high population density. Population-orientation refers to the presence of people in a geographic area around a monitoring site that may be much smaller than the block group. If there is not a substantial number of people spending a significant fraction of their day in the area around the monitor with ambient concentrations of about the magnitude indicated by a monitor, the monitor is not population oriented, regardless of the population density of the surrounding census block group. For example, there could be a portion of a high-density block group that is near a source but which has few residents or visitors because of its land use type, for example.

[56] A microscale environment is one in which there are significant differences in concentrations between locations that are 10 meters to 100 meters apart, and generally are areas that are impacted by immediately adjacent sources such as industrial sites, roadways, or construction sites.

[57] i.e., coarse particles typically are deposited in the form most recently emitted by their original source (or in the form they had when resuspended after having deposited to a roadway or construction site) rather than being created or modified by atmospheric chemical reactions during their generally short transport from the point of original emission (or resuspension). Particles that have been resuspended may have incorporated secondarily formed compounds at some time in their prior history.

[58] Air Quality Criteria for Particulate Matter, Volume I of II, EPA/600/P–99/002aF, October 2004, p. 2–49. See also section III.G in the NAAQS proposal elsewhere in today's **Federal Register**.

[59] We note that this proposed language is more restrictive for the proposed 24-hour $PM_{10-2.5}$ NAAQS than parallel language for the 24-hour $PM_{2.5}$ NAAQS (which allows such data to be used for comparison with the 24-hour $PM_{2.5}$ NAAQS, see present 40 CFR part 58, appendix D, section 2.8.1.2.3). As explained in the text above, this is because coarse PM is transported over shorter distances such that a microscale $PM_{10-2.5}$ monitor would not be representative of community-wide conditions.

tracts are defined as combinations of (usually a few) block groups, and would provide a somewhat larger scale of analysis around a candidate monitoring site.

While the issue of setting boundaries for nonattainment areas is not a subject of this rulemaking, we note that the considerations that underlie the proposed suitability test, having to do with the influence of sources on measured concentrations, may also be relevant to the setting of such boundaries.

The five-part suitability test will leave as suitable many sites in a MSA, falling into the three broad categories described earlier. We believe that States should be given further direction on placement of the required monitors among these sites. A network design strategy should not allow all required $PM_{10\text{-}2.5}$ monitoring sites to be located so far from large emissions sources that they measure ambient concentrations lower than would be representative of the impact of coarse particle sources on well populated urban areas. We propose to address this issue by adopting some of the elements of the monitoring siting approach that has been used for the PM_{10} NAAQS. We propose that 50 percent of required $PM_{10\text{-}2.5}$ monitors[60] be required to represent population-oriented middle scale-sized areas[61] [62] near but not adjacent to large sources of PM (i.e., heavily traveled paved roadways, long-term construction sites, large industrial sources) to characterize air quality in significant-sized areas that are affected by emissions from these sources where people may spend a greater part of their day.[63] The placement of a monitor on the grounds of a school within a residential community that is near but not adjacent to an industrial facility would be an example of such a site. With this requirement for middle scale $PM_{10\text{-}2.5}$ sites, EPA's proposal provides the intended degree of protection in populated areas with high coarse particle concentrations by requiring sites that are likely to measure the maximum concentrations (among sites meeting the suitability test) in one or more of the populated areas that are impacted by the heaviest PM emissions from roadways and/or industrial/construction sources.

For those areas with monitoring requirements greater than one required monitor, we propose that at least one of the required monitors must be sited in a neighborhood scale-sized area[64] that is highly populated and which may be somewhat further away from emission sources but is still expected to have elevated levels of coarse particles of concern. These sites would typically still be impacted by roadway and/or industrial/construction source emissions, but to a lesser extent than sites expected to measure maximum concentrations. Among such sites, the State should select a site characterized by a very large number of people subject to exposure; typically, this population number would be higher than the population at sites expected to record maximum concentrations. A site located within a heavily populated residential and commercial area that is in proximity to roadways with high vehicular traffic would be an example of this type of monitor placement. A site of this type is useful for several reasons. It will help define the spatial gradients of $PM_{10\text{-}2.5}$ concentrations, which may be useful in setting nonattainment area boundaries. It likely will provide concentration data that are relevant for informing a large segment of the population of their exposure levels on a given day. Also, areas of this type may have $PM_{10\text{-}2.5}$ nonattainment problems that are caused by a different source mix than problems found at the first type of site, and require a different approach to reducing concentrations. For example, the mix of industrial and paved road emissions may be different or the mix of types of vehicles on paved roads may be different.

For MSA with a requirement for one, two, or three monitors, the above two siting provisions address the siting of all required monitors with respect to proximity to specific sources and populations. For MSA with a requirement for four or five monitors, there is one remaining required monitor not yet addressed. We propose that the siting of this monitor be left to the discretion of the State or local monitoring agency, subject to a restriction that the site satisfy the suitability test described above. This site could be placed in locations similar to those that would be eligible as monitoring sites for the other required monitors, i.e., at other sites that meet one of the above two proposed siting requirements. A State may also choose to place the site in a location that is somewhat more distant from downtown areas, main industrial source regions, or areas of highest traffic density, such as in a highly populated suburban residential community. The comparison of ambient $PM_{10\text{-}2.5}$ concentrations between such suburban monitors and those monitors located at the previously described maximum exposure-type of sites would provide comparative data for assessing the spatial variation of $PM_{10\text{-}2.5}$ concentrations over a metropolitan area.

While we expect the proposed suitability test described above will appropriately identify areas where the ambient mix of $PM_{10\text{-}2.5}$ is dominated by resuspended dust from high-density traffic on paved roads and PM generated by industrial sources and construction sources, it may not identify them all. We recognize that it does not address the possibility that high density traffic on paved roads, large industrial emission sources, and/or construction activities may be located outside an urbanized area (including outside any MSA) or in parts of an urbanized area that do not satisfy the second part of the suitability test (related to population density) such that monitoring sites near these sources would not meet the proposed test, yet persons living or working near the source could be exposed to concentrations of $PM_{10\text{-}2.5}$ which are dominated by the PM emissions from these sources. We invite comment on alternative approaches that would examine areas where States may wish to place non-required monitors that do not meet the proposed suitability test, but are locations of industrial emissions or high traffic on paved roads which create the potential for ambient mixes of coarse particles of the type intended to be included by the indicator. In particular, EPA solicits comment on a modification of the proposed test that would specify that a site meeting only the third, fourth, and fifth parts of the

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[60] Fractional monitor requirements would round up. MSA with one, two, three, four, or five required monitors would place one, one, two, two, or three monitors in this manner, respectively.

[61] A middle scale-sized area is one in which there are significant differences in concentrations between locations that are 100 meters to 500 meters apart, and generally are areas that are impacted by nearly adjacent (but not immediately adjacent) sources, such as industrial sites, roadways, or construction sites. Middle scale sites are common in PM_{10} monitoring (see present 40 CFR part 58, appendix D, section 2.8.0.2) and typical of the PM_{10} sites used to establish the equivalency of the proposed $PM_{10\text{-}2.5}$ NAAQS to the current PM_{10} NAAQS.

[62] Additional information on middle-scale siting, and on all such monitoring scales, can be found in the document: Guidance For Network Design and Optimum Site Exposure For $PM_{2.5}$ and PM_{10}. U.S. Environmental Protection Agency. EPA–454/R–99–022. December 1997. Available on the web at: *http://www.epa.gov/ttn/amtic/files/ambient/pm25/network/r-99–022.pdf.*

[63] If only one monitor is required, then that monitor would need to conform to this siting requirement (if the monitor is to be considered as part of the minimum network design).

[64] A neighborhood scale-sized are is one in which there are not typically significant differences in concentrations between locations that are 500 meters to four kilometers apart, and generally are areas that are impacted by the more well-mixed emissions of urban industrial and mobile sources in the general vicinity of the site.

suitability test could be compared to the NAAQS if it were close enough to an industrial source of coarse particles of a defined high enough emissions level (for example, 100 tons per year or more of emissions) that the ambient mix would be dominated by PM generated by that industrial source. The term ''industrial'' would be made operational by using a source's assigned industry code under the North American Industry Classification System (NAICS) and excluding sources with codes corresponding to agricultural or mining industries.[65] As noted, the site would have to population-oriented and could not be in the micro-scale environment affected by a large source. A site-specific assessment (the fifth part of the suitability test) would still be required, and would consider the local mix of emission source types and sizes, their relative locations to the potential monitoring site, and local factors affecting transport and deposition of $PM_{10-2.5}$. Such monitors, even if determined to be comparable to the NAAQS through the site-specific assessment, would not count toward the minimum number of monitors required for each MSA.

We also invite comment on the possibility of another, similar modification to the proposed suitability test as that just described for industrial sources, but addressing emissions from vehicle traffic on roadways. Non-required State sites otherwise excluded from comparison to the NAAQS, based on their location outside of a U.S. Census Bureau-defined urbanized area and/or their location in block groups with population density below the proposed threshold, but are population oriented and within some distance of a roadway with a certain traffic volume per day, could be the subject of site-specific analysis to determine if they are in fact suitable for comparison to the NAAQS based on the PM emissions from sources that dominate $PM_{10-2.5}$ concentrations at those sites. Such sites would have to be population-oriented and could not be in the micro-scale environment affected by the roadway. The site-specific assessment would consider the local mix of emission source types and sizes, their relative locations to the potential monitoring site, and local factors affecting transport and deposition of $PM_{10-2.5}$. We seek comment on whether such sites would be appropriate for comparison to the NAAQS, and, if so, what levels of VMT must occur and/or other conditions exist before comparison to the NAAQS could be considered. We note that traffic volume alone is not a direct predictor of emissions of resuspended dust and other $PM_{10-2.5}$ emissions, since the load of dust on the highway and the mix of vehicle types matter also. Such monitors, even if determined to be comparable to the NAAQS through the site-specific assessment, would not count toward the minimum number of monitors required for each MSA.

iii. *Non-required monitoring.* States may deploy $PM_{10-2.5}$ monitors in addition to those that would be required. For example, additional monitors in areas that are required to have one or more monitors may be very useful for determining nonattainment area boundaries. States might also want to site monitors near large point sources, if the final rule provides for the suitability of monitoring sites near such sources. The EPA will work with States as they consider what additional monitors to deploy and operate.

The proposed suitability test for comparison with the $PM_{10-2.5}$ NAAQS applies to all non-required monitors (as well as all required monitors). Data from monitors that do not meet the suitability test could not be used for nonattainment determinations. For example, as with required monitors, non-required monitors must also be population-oriented as defined above in order to be used for nonattainment designations. Also, as with required monitors, non-required monitors could not be compared to the NAAQS if they are located in source-influenced micro-environments, such as on facility fence lines or along the edge of traffic lanes.

iv. *Speciation monitoring.* In addition to sites measuring $PM_{10-2.5}$ mass concentration, our experience with $PM_{2.5}$ suggests that it would be useful to have a long-term $PM_{10-2.5}$ speciation network of 50 to 100 sites to assess physical and chemical characteristics at a nationally diverse set of locations. Speciation data would help identify the specific source types, address the relative contribution of anthropogenic and natural sources to ambient concentrations, and support future research concerning the health risks of coarse particles of various compositions and source origins. We propose that one speciation site be located in each of the MSAs with total population greater than 500,000 people and that also have an estimated $PM_{10-2.5}$ design value greater than 80 percent of the proposed $PM_{10-2.5}$ NAAQS. We expect that approximately 25 MSAs will be required to have speciation monitors based on these proposed criteria. These sites will gather data in areas that have a higher probability of exceeding the proposed NAAQS and also have larger exposed populations at risk, and would support the characterization of coarse particles concentrations that control the attainment/nonattainment status of the area. States would be required to operate any of these speciation sites that were located inside their borders. In some cases, monitors could be collocated with $PM_{2.5}$ speciation monitors at urban NCore multipollutant monitoring stations to provide comparative chemical characterization studies between fine and coarse particles. The $PM_{10-2.5}$ mass concentration data obtained with speciation monitors would be comparable to the NAAQS only in situations where the underlying sampling method used to obtain the filters was an approved FRM or FEM and the site met the suitability test described earlier in this section.

We will collaborate with States to select and fund additional sites based on data requirements, individual State needs, and availability of funds. The EPA solicits comment on all aspects of the $PM_{10-2.5}$ speciation network including the number of required sites, the total size of the network, the criteria for choosing the number of required monitors in each area, the sampling method used to obtain filters, and frequency and types of analyses that would be performed on those filters.

c. Monitoring plan requirements and approval process.

We propose that each State be required to submit to the respective EPA Regional Administrator a plan proposing how all affected monitoring organizations within the State will comply with the requirements described above for the type, sampling schedule, number, and location of $PM_{10-2.5}$ monitoring stations. The plan would also provide supporting information for why each monitoring site which the State proposes to count towards the requirement for a minimum number of monitors is suitable for comparison to the $PM_{10-2.5}$ NAAQS, based on the criteria described above. In addition, for each non-required monitoring site which the State intends to deploy and which the State considers would be appropriate for comparison to the proposed $PM_{10-2.5}$ NAAQS, the plan would also provide evidence that the monitor is suitable for comparison, based on the criteria described above. The State would be required to make this plan available for public inspection for at least 30 days prior to submission to EPA.

This plan would be due to EPA January 1, 2008. The EPA Regional Administrator may extend this due date

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[65] Information on the NAICS is avaialble at *http://www.census.gov/epcd/naics02/.*

to July 1, 2008, for example to allow it to be consolidated with the overall annual monitoring review and plan due at that time.

The EPA Regional Administrator will review the submitted plan and approve or disapprove it by a letter to the submitting State official within 120 days of submittal. The EPA Regional Administrator will be required to invite public comment; he/she must consider relevant public comments, if any are received in response to the invitation. We are not proposing a specific mechanism for the Regional Administrator to make the plan available for public comment, but we invite comment now on mechanisms that would be practical for the Regional Administrators and effective for persons likely to want to comment. The approval, if given, will include confirmation that EPA will treat each planned monitoring site as suitable or not suitable for comparison to the $PM_{10\text{-}2.5}$ NAAQS, along with the reasons for each determination. This confirmation will be a final EPA action applicable to subsequent determinations of attainment or nonattainment. This status will then be recorded in AQS for each monitor by the State.

Elsewhere in this notice (section IV.E.11), we are proposing a new requirement for States to conduct and submit to EPA a comprehensive monitoring system assessment at five-year intervals. The status of each $PM_{10\text{-}2.5}$ monitoring site with respect to comparability to the NAAQS should be re-examined during these assessments, starting with the first assessment which is submitted not less than 5 years after EPA Regional Administrator approval of the initial $PM_{10\text{-}2.5}$ monitoring plan. The State may also propose a change in the status of a $PM_{10\text{-}2.5}$ monitor whenever a large existing source of $PM_{10\text{-}2.5}$ near the monitor ceases (or begins) operation and is expected to remain shut down (or to continue operation)for three or more years, if the type of source involved is such that its shut down or start up could materially affect what types of emissions dominate the $PM_{10\text{-}2.5}$ measured at the site.

We invite comment on this proposed process and possible alternatives or additions to it, for example on whether there should be review by the EPA Administrator before the approval or disapproval is considered a final Agency action, or an opportunity for appeal to the Administrator to alter the final action.

3. Monitoring Requirements for the Proposed Primary and Secondary National Ambient Air Quality Standards for $PM_{2.5}$

The current $PM_{2.5}$ network includes over 1,200 FRM samplers at approximately 900 sites that are operated to determine compliance with the NAAQS; track trends, development, and accountability of emission control programs; and provide data for health and ecosystem assessments that contribute to periodic reviews of the NAAQS. Over 450 continuous $PM_{2.5}$ monitors are operated to support public reporting and forecasting of the AQI.

For $PM_{2.5}$, EPA proposes to modify the network minimum requirements for $PM_{2.5}$ monitoring so that multiple urban monitors in the same CBSA are not required if they are redundant or measuring concentrations well below the NAAQS. We propose to base minimum monitoring requirements for $PM_{2.5}$ on $PM_{2.5}$ concentrations as represented by a design value, and on the census population of the CBSA. Overall, this is expected to result in a lower number of required sites; however, we recommend and anticipate that States continue to operate a high percentage of the existing sites now utilizing FRM, but with FEM and ARM continuous methods replacing the FRM monitors at many of these sites.[66]

We are proposing to require that all sites counted by a State towards meeting the minimum requirement for the number of $PM_{2.5}$ sites have an FRM, FEM, or ARM monitor. We are also proposing that at least one-half of all the required $PM_{2.5}$ sites be required to operate $PM_{2.5}$ continuous monitors of some type even if not an FEM or ARM. This requirement would ensure that continuous methods continue to be well utilized throughout the network to support monitoring objectives such as public reporting and forecasting of the AQI not readily addressed by FRM and filter-based FEM.

As noted, EPA proposes to use design value and population as inputs in deciding the minimum required $PM_{2.5}$ monitoring sites in each CSA/CBSA. We are proposing these inputs so that monitoring resources are prioritized based on the number of people who may be exposed to a problem and the level of exposure of that population. Metropolitan areas with smaller populations would not be required to perform as much monitoring as larger areas. If ambient air concentrations as indicated by historical monitoring are low enough, these smaller population areas would not be required to continue to perform any $PM_{2.5}$ monitoring.

The proposed amendments would require fewer sites when design values are well above (rather than near) the NAAQS to allow more flexibility in the use of monitoring resources in these areas where States and EPA are already more certain of the severity and extent of the $PM_{2.5}$ problem and possibly in more need of other types of data to address it. For instance, an agency may wish to operate more speciation samplers rather than FRM to get a better understanding of the atmospheric chemistry of an area. We invite comments on this approach, versus requiring more FRM/FEM monitors in areas well above the NAAQS.

The proposed siting criteria for $PM_{2.5}$ monitors would remain the same as current requirements, which have an emphasis on population-oriented sites at neighborhood scale and larger. Population-oriented middle scale sites would remain a part of the network for comparison to both the daily and annual standard when a site can represent many other middle-scale locations where people are exposed. For middle-scale sites that are unique, only the daily NAAQS would be considered when comparing data to the standard.

Background and transport sites would remain a required part of each State's network to support characterization of regional transport and regional scale episodes of $PM_{2.5}$. To meet these requirements, IMPROVE samplers may be used even though they would not be eligible for comparison to the $PM_{2.5}$ NAAQS; these samplers are currently used in visibility monitoring programs in Class I areas and national parks. Sites in other States which are located at places that make them appropriate as background and transport sites can also fulfill these minimum siting requirements.

The proposed change in the primary 24-hour $PM_{2.5}$ NAAQS from 65 $\mu g/m^3$ to 35 $\mu g/m^3$ raises the issue of whether any commensurate changes would be needed in the $PM_{2.5}$ ambient monitoring network regulations. The current specific network design criteria for $PM_{2.5}$ in appendix D to 40 CFR part 58 directs States to select sites mostly representative of community-oriented area-wide $PM_{2.5}$ exposure levels at locations of neighborhood or larger scale, except in cases where a certain population-oriented microscale or middle-scale $PM_{2.5}$ site is determined to represent similar locations that

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[66] An approved regional method (ARM) is a $PM_{2.5}$ method that has been approved specifically within a State, local, or tribal air monitoring network for purposes of comparison to the National Ambient Air Quality Standards and to meet other monitoring objectives. See section IV.D.2 of this preamble.

collectively form a larger region of localized high ambient $PM_{2.5}$ concentrations. The EPA believes that these current design criteria remain appropriate for implementation of the proposed primary $PM_{2.5}$ NAAQS. The existing minimum requirements effectively ensure that monitors are placed in locations that appropriately reflect the community-oriented area-wide concentrations levels used in the epidemiological studies that support the proposed lowering of the 24-hour NAAQS.

Most often, the current location of maximum monitors around $PM_{2.5}$ concentrations is the same as the location of maximum monitored 24-hour $PM_{2.5}$ concentrations, suggesting that no shifts in monitors would be needed to implement the proposed 24-hour NAAQS. In a relatively small number of cases[67], certain microscale $PM_{2.5}$ monitors that have not been eligible for comparison to the annual $PM_{2.5}$ NAAQS and that have been complying with the 24-hour $PM_{2.5}$ NAAQS, and therefore have not impacted the attainment status, may become more influential to attainment status under a more stringent 24-hour form of the NAAQS. Some sites that have not measured high concentrations relative to the current 24-hour NAAQS may also become more influential to attainment status under the proposed more stringent 24-hour NAAQS. In these cases, States may choose to move accompanying speciation and continuous monitors to the new site of particular interest to get a better characterization of PM at that location. States and EPA may also agree on changing the location of some $PM_{2.5}$ FRM/FEM sites to insure measurements at the population-oriented location(s) of most interest.

In proposed changes to 40 CFR 58.10 (Monitoring Network Description and Periodic Assessments), monitoring agencies would be required to provide a network plan that includes the identification of any $PM_{2.5}$ sites that are not suitable for comparison against the annual $PM_{2.5}$ NAAQS. The proposed requirements would also provide for a public hearing and review of changes to a $PM_{2.5}$ monitoring network that impact the location of a violating $PM_{2.5}$ monitor, prior to requesting EPA approval of the changes. Through this process, monitoring agencies would be able to consider changes to their $PM_{2.5}$ monitoring networks made in response to the proposed NAAQS, and inform the public about the potential implications on design values and resulting attainment and nonattainment decisions.

In today's NAAQS proposal (published elsewhere in this **Federal Register**), EPA requests comments on the alternative of basing a $PM_{2.5}$ secondary standard on a shorter-term averaging interval of less than 24-hours to provide protection against visibility impairment primarily in urban areas.

If the alternative short-term secondary standard is promulgated, EPA envisions that compliance would be assessed with data from continuous $PM_{2.5}$ monitoring methods capable of providing hourly time resolution. Continuous monitors would be required to comply with FEM or ARM requirements. Hourly $PM_{2.5}$ data values would be averaged over the appropriate short-term averaging interval (*e.g.*, four to eight hours) to assess compliance with the proposed short-term secondary NAAQS. The alternative short-term secondary NAAQS would also require minor additions to the current $PM_{2.5}$ siting requirements. Some continuous monitors would likely be required to be sited on a neighborhood and urban scale to form the basis of a network representing ambient $PM_{2.5}$ conditions along corridors that influence visibility of important scenic resources in and around urban areas. Sites might also want to consider collocating such monitors with automated haze-cam systems to quantify local relationships between short-term $PM_{2.5}$ concentrations and visual range.

4. Proposed Monitoring Requirements for PM_{10}

In the PM NAAQS proposal published elsewhere in this **Federal Register**, EPA proposes to revoke the PM_{10} annual standard. Further, consistent with the more targeted nature of the proposed new $PM_{10\text{-}2.5}$ indicator, the Administrator proposes to revoke the current 24-hour PM_{10} standard everywhere except in areas where there is at least one monitor that violates the 24-hour PM_{10} standard. In areas where both applicable PM_{10} NAAQS are revoked, we propose to have no minimum PM_{10} monitoring requirements and to allow discontinuation of PM_{10} monitors without prior EPA approval, although monitoring organizations would have the option of funding and operating PM_{10} monitors as needed to satisfy any still-applicable SIP commitments or to monitor compliance with non-Federal air quality standards. In areas where the PM_{10} NAAQS are not both revoked, we propose to have no minimum requirements, but to require prior EPA approval for changes to existing monitors. See also section IV.E.8 of this preamble.

5. Proposed Requirements for Operation of Ozone Monitoring Sites

Ozone (O_3) monitoring sites are operated to determine compliance with the NAAQS; to track trends, development, and accountability of emission control programs; to provide data for health and ecosystem assessments that contribute to ongoing reviews of the NAAQS; and to support public reporting and forecasting of the AQI. For O_3, EPA proposes to change the minimum network requirement from at least two sites in ''any urbanized area having a population of more than 200,000'' to an approach that considers the level of exposure of O_3, as indicated by the design value and the census population of an area. Larger population CSA and CBSA with design values near the O_3 NAAQS would be required to operate at least four sites. Smaller CSA and CBSA would be required to operate as few as one site, provided the design values were sufficiently low enough. Similar to the proposal for $PM_{2.5}$, EPA proposes that areas with measured ambient concentrations significantly above the NAAQS be required to operate fewer sites than areas with measured ambient concentrations near the NAAQS to allow flexibility of resources in those areas. We invite comments on this approach.

The O_3 monitoring network is primarily based on continuous FEM using ultraviolet analysis. The network is well deployed throughout the country at about 1,100 sites with most metropolitan areas already operating more O_3 monitors than would be required by today's proposed amendments. The EPA does not anticipate or recommend significant changes to the size of this network because O_3 remains a pollutant with measured levels near or above the NAAQS in many areas throughout the country. However, the proposed amendments would help to better prioritize monitoring resources depending on the population and relative levels of O_3 in an area.

6. Proposed Requirements for Operation of Carbon Monoxide, Sulfur Dioxide, Nitrogen Dioxide, and Lead Monitoring Sites

Criteria pollutant monitoring networks for the measurement of CO, SO_2, NO_2, and Pb are primarily operated to determine compliance with the NAAQS and to track trends and accountability of emission control

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[67] EPA is presently aware of less than 10 $PM_{2.5}$ monitors that are sited in a manner that is unsuitable for comparison to the annual NAAQS.

programs as part of a SIP. Because these criteria pollutant concentrations are typically well below the NAAQS, there is limited use for public reporting to the AQI, except for a very small number of locations with on-going local air quality issues.

Gas measurements of CO, SO_2, and NO_2 utilize continuous technologies. Lead (Pb) is sampled by collecting total suspended particulates (TSP) on a high-volume sampler and analyzed in a laboratory.

We are proposing to revoke all minimum requirements for CO, SO_2, and NO_2, monitoring networks, and reduce the requirements for Pb. This proposal allows for reductions in ambient air monitoring for CO, SO_2, NO_2, and Pb, particularly where measured levels are well below the applicable NAAQS and air quality problems are not expected, except in cases with ongoing regulatory requirements for monitoring such as SIP or permit provisions. In these cases, EPA encourages States to comment on ways to reduce these potentially unnecessary monitors. We will also work with some States on a voluntary basis to make sure that at least some monitors for these pollutants remain in place in each EPA region. Measurement of CO, SO_2, and NO_y are being proposed as required measurements at NCore sites. There may be little regulatory purpose for keeping many other sites showing low concentrations, other than specific State, local, or tribal commitments to do so. However, in limited cases, some of these monitors may be part of a long-term record utilized in a health effects study. The EPA expects State and local agencies to seek input on which monitors are being used for heath effects studies prior to shutting down a monitor. See also section IV.E.8 of this preamble (Proposed criteria and process for discontinuing monitors).

7. Proposed Changes to Minimum Requirements for Ozone Precursor Monitoring

Section 182(c)(1) of the CAA required us to promulgate rules requiring enhanced monitoring of ozone, oxides of nitrogen, and volatile organic compounds in ozone nonattainment areas classified as serious, severe, or extreme. On February 12, 1993, we promulgated requirements for State and local monitoring agencies to establish Photochemical Assessment Monitoring Stations (PAMS) as part of their SIP monitoring networks in ozone nonattainment areas classified as serious, severe, or extreme. During 2001, we formed a workgroup consisting of EPA, State, and local monitoring experts to evaluate the existing PAMS network. The PAMS workgroup recommended that the existing PAMS requirements be streamlined to allow for more individualized PAMS networks to suit the specific data needs for a PAMS area.

We are proposing changes to the minimum PAMS monitoring requirements in 40 CFR part 58 to implement the recommendations of the PAMS workgroup. Specifically, we are proposing the following changes:

- The number of required PAMS sites would be reduced. Only one Type 2 site would be required per area regardless of population and Type 4 sites would not be required. Only one Type 1 or one Type 3 site would be required per area.
- The requirements for speciated VOC measurements would be reduced. Speciated VOC measurements would only be required at Type 2 sites and one other site (either Type 1 or Type 3) per PAMS area.
- Carbonyl sampling would only be required in areas classified as serious or above for the 8-hour O_3 standard.
- NO_2/NO_X monitors would only be required at Type 2 sites.
- NO_y will be required at one site per PAMS area (either Type 1 or Type 3).
- Trace level CO would be required at Type 2 sites.

Note that on April 15, 2004, we revised some O_3 nonattainment classifications, under the 8-hour O_3 standard (69 FR 23951). While the number of areas classified as serious, severe, or extreme ozone nonattainment under the 8-hour O_3 standard has been greatly reduced (69 FR 23857), areas that had previously been classified as serious, severe, or extreme ozone nonattainment under the 1-hour O_3 standard are required to comply with the PAMS monitoring requirements until they achieve compliance with the 8-hour ozone standard. See 40 CFR 51.900(f)(9). In addition, the PAMS requirements would apply to any new areas that are classified or reclassified as serious, severe, or extreme O_3 nonattainment under the 8-hour O_3 standard.

We solicit comments on the proposed revisions to the PAMS monitoring program requirements including the measurements to be made, the sampling frequencies, and the location and numbers of required monitoring sites proposed.

8. Proposed Criteria and Process for Discontinuing Monitors

The EPA has determined that many single-pollutant monitors operated by State and local agencies, specifically many of those measuring CO, Pb, PM_{10}, SO_2, and NO_2, are providing data that have limited usefulness in air quality management. This is likely the case for monitors whose data indicate current attainment of the corresponding NAAQS with little prospect for future nonattainment. Accordingly, consistent with the draft National Ambient Air Monitoring Strategy (NAAMS), we are proposing to eliminate the current requirements for operation of a certain minimum number of monitors for CO, PM_{10}, SO_2, and NO_2, and to reduce the requirements for Pb monitors, as described in section IV.E.6 of this preamble. We are also proposing changes to loosen the minimum requirements for monitoring of O_3 precursors in the PAMS program, as described in section IV.E.7 of this preamble. We are also proposing changes to the minimum requirements for O_3 and $PM_{2.5}$ monitoring that may have the effect of reducing the minimum number of these monitors in some areas. We note that the remaining specific minimum requirements (limited to O_3, $PM_{2.5}$, and $PM_{10\text{-}2.5}$) are intended to be necessary but are not always sufficient to meet the requirement in section 110(a)(2)(B) of the Clean Air Act (CAA) that SIP provide for operation of appropriate systems to monitor, compile, and analyze data on ambient air quality. We intend to require many States to operate some monitors for these pollutants, but to determine what monitoring is appropriate on a more case-by-case basis. The EPA encourages, and in fact the proposed amendments to 40 CFR part 58 would require, all States to assess their monitoring networks periodically to determine what changes should be made, including which monitors should be discontinued and which retained. Local situations will differ, and should be considered individually. Reducing low-value monitoring expenditures would allow resources to be devoted to under-served and new monitoring purposes.

Some monitors in excess of the remaining minimums may be necessary to the State/local air quality management process, or for other uses, such as development and validation of air quality models. We are proposing to continue to require States to propose changes in their monitoring networks and obtain EPA approval before making changes, even when the remaining minimum requirements for number of monitors would still be met. This EPA review and approval can take place through the mechanism of the annual monitoring plan. The current rule already requires State agencies to prepare and submit the plan on July 1 of each year for EPA approval at the Regional Office level. We are proposing to retain this current requirement. We will approve proposed changes to a monitoring plan provided the proposed network will still meet any applicable SIP provisions related to ambient monitoring and will provide data needed to support the air quality control program. Based on assessments that we and individual States have done to date, we generally expect to find that a large percentage—between 33 percent for SO_2 and 90 percent for NO_2—of current monitors for CO, PM_{10}, SO_2, and NO_2 can be removed; that most O_3 monitors should continue although some should be moved to more productive locations; that some filter-based $PM_{2.5}$ monitors can be removed; and that some filter-based $PM_{2.5}$ monitors should be replaced by continuous instruments when models that have been approved as FEM or ARM are available.

While local situations need to be considered individually, we believe that certain general principles can be articulated regarding reductions in monitoring networks. We have incorporated these principles in the proposed amendments to reduce uncertainties in the process and thereby facilitate an efficient and timely process for review and approval or disapproval of proposed changes. These principles would apply independently. A monitor meeting any one of them would qualify for EPA approval for discontinuation. Situations not addressed by these criteria would be considered on a case-by-case basis. The EPA Regional Offices would have more time to give this case-by-case consideration to the exceptional cases because cases meeting one of the following criteria could be disposed of more quickly.

- Any $PM_{2.5}$, O_3, CO, PM_{10}, SO_2, Pb, or NO_2 monitor which has shown attainment during the previous 5 years, that has a probability of less than 10 percent of exceeding 80 percent of the NAAQS during the next 3 years based on the levels, trends, and variability observed in the past, and which is not specifically required by an attainment plan or maintenance plan, can be removed or moved to another location.[68, 69] Few if any O_3 monitors in urban areas would likely meet this criterion, but some $PM_{2.5}$ monitors may do so. This criterion would not apply to a $PM_{2.5}$ monitor that is part of a spatial averaging plan.
- A monitor for CO, PM_{10}, SO_2, or NO_2, which has consistently measured lower concentrations than another monitor for the same pollutant in the same county and same nonattainment area during the previous 5 years, and which is not specifically required by an attainment plan or maintenance plan, could be removed or moved to another location, if control measures scheduled to be implemented or discontinued during the next 5 years would apply to the areas around both monitors and have similar effects on measured concentrations, such that the retained monitor would remain the higher reading of the two monitors being compared.[70]
- For any pollutant, the highest reading monitor (which may be the only monitor) in a county (or portion of a county within a distinct nonattainment or maintenance area) could be removed or moved to a new location provided the monitor has not measured NAAQS violations in the previous 5 years, the CBSA within which the county lies (if in any) would still meet requirements for the minimum number of monitors for the applicable pollutant if any, and the approved SIP provides for a specific, reproducible approach to representing the air quality of the affected county in the absence of actual monitoring data. For example, the SIP could provide that a continuing monitor in a neighboring county will always be taken by the State and EPA to represent both counties for purposes of nonattainment and other regulatory determinations. Because EPA would review and approve any SIP revision that provides such an approach to representing air quality in the affected county, EPA can ensure its technical validity and protectiveness. We intend to take a cautious approach to allowing removal of such monitors, particularly in urban areas. While approval of such SIP revisions would be delegated to the Regional Offices, EPA Headquarters officials would participate in the review of proposed revisions that present the first instance of specific approaches, and would resolve issues of national consistency if such issues arise.
- A monitor, which EPA has determined cannot be compared to the relevant NAAQS because of the siting of the monitor, could be moved or removed. For example, a $PM_{2.5}$ monitor must be population-oriented to be comparable to the daily or annual NAAQS, and one that is not population-oriented could be removed.[71]
- A monitor that is designed to measure concentrations upwind of an urban area for purposes of characterizing transport into the area and that has not recorded violations of the relevant NAAQS in the previous 5 years could be moved to another location where information on transport will be more useful to SIP development.
- A monitor not eligible for removal under any of the above criteria could be moved to a nearby location with the same scale of representation if logistical problems beyond the State's control make it impossible to continue operation at its current site. For example, the State may lose access to a monitoring site not owned by the State itself, and this criterion would ensure approval of a new site that was nearby and that had the same scale of representation (e.g., middle-scale or neighborhood-scale). A move to a more distant site would require case-by-case EPA review of the appropriateness of the new location compared to other alternatives.

In the situations covered by these proposed criteria, the State would need to make a factual showing that the specified conditions are met. Once the EPA Regional Office accepts that showing, the proposed amendments would require approval of the State's request as part of the Regional Office action on the annual monitoring plan. We may issue guidance suggesting appropriate ways these showings can be made.

We invite comments on the specific details of these proposed criteria, and on other criteria that would be appropriate.

In order to help information be available to the State and to EPA that could be relevant to the appropriateness of monitoring network changes, we propose that each State be required to make available for public inspection its draft annual monitoring plan for a

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[68] The concept of using historical data to statistically predict the probability of a future violation is an element of EPA's current policy memo on ''Limited Maintenance Plan Option for Moderate PM_{10} Nonattainment Areas,'' August 9, 2001. See *http://www.epa.gov/ttn/oarpg/t1/fact_sheets/lmp_fs.pdf* and *http://www.epa.gov/ttn/oarpg/t1/memoranda/cdv.pdf*. EPA believes that this concept can be generalized to the other pollutants listed in this paragraph, but the details of the probability estimation method(s) will likely differ.

[69] Five years of historical data means five successive calendar years of data sufficient for making an attainment determination.

[70] $PM_{2.5}$ and O_3 are not included in this proposed criterion because of the value of even low-reading monitors in understanding the causes of nonattainment and in informing the public about potential exposures. Lead (Pb) is not included because Pb concentrations are often very dependent on effective control of Pb emissions of individual sources very close to the monitor and we believe it would be too risky to depend on area-wide generalizations about the effect of scheduled controls. Also, we believe the effectiveness of emission controls on Pb sources may be more variable over time than of CO, SO_2, PM_{10}, and NO_2 emission controls on sources of those pollutants.

[71] Section 2.8.1.2.3 of appendix D to 40 CFR part 58 (Network Design for State and Local Air Monitoring Stations (SLAMS)).

period of at least 30 days prior to submitting it to the EPA Regional Office for approval. The State could, for example, satisfy this proposed requirement by making the draft plan available for download via the air agency's Internet Web site. We also propose that when submitting the annual monitoring plan for EPA approval, the State provide evidence that: (1) The State has considered the ability of the proposed network to support air quality characterization for areas with relatively high populations of susceptible individuals (e.g., children with asthma); and (2) if the State proposes to discontinue any monitoring sites, the State has considered how discontinuing monitoring sites would affect data users other than the monitoring agency itself, such as nearby States and tribes or health effects research studies. We invite comment on where EPA should provide opportunity to examine and comment on monitoring plans after they are reviewed by the Regional Office.

9. Special Purpose Monitors

The development of today's proposed amendments has given EPA occasion to re-examine the longstanding issue of whether the ambient air monitoring rules and current policies regarding use of monitoring data for regulatory determinations have the effect of creating undue and counterproductive disincentives to States and other organizations deploying discretionary monitors that overall and in the long run would benefit air quality management efforts. The EPA is proposing a limited change in the monitoring rules on this issue.

At present, each State at any given time is required to operate a certain set of monitors under the monitoring regulations and its own approved monitoring plan, or to meet commitments it has made in its SIP and/or grant agreement(s) with EPA. If a State chooses to deploy an additional monitor, it may designate it as a special purpose monitor (SPM). Such designation can afford the State certain flexibility it would not have if the monitor were designated as an NCore station or State and local air monitoring station (SLAMS).[72] However, regardless of whether a monitor is designated as an SPM, if it is an appropriately-sited FRM or FEM monitor and if its operation meets the QA requirements of 40 CFR part 58, or if the data are otherwise determined to be technically valid, EPA considers all available data from that monitor whenever we make a determination of attainment or nonattainment. The possibility that data from an SPM could result in a nonattainment designation of an area that would otherwise not be so designated may discourage the State from deploying a new monitor or supporting the deployment of a monitor by another organization, such as a university, even when the monitor would provide useful information for determining the extent, severity, causes, and possible solutions of a known or suspected air quality problem. Thus, a State that might have voluntarily addressed a nonattainment problem may never become aware of the problem. Also, affected persons may also be left unaware and unable to reduce their own exposures by modifying their behavior or to advocate for State action to address the problem.

We addressed this issue in the 1997 rulemaking that established the current requirements for $PM_{2.5}$ monitoring, and created a narrow exception to the practice that all known, good air quality data be considered in such determinations. (See preamble discussion at 62 FR 38770, July 18, 1997 and in existing 40 CFR 58.14(b).) That narrow exception addressed only new SPM for $PM_{2.5}$ concentrations. It provides that $PM_{2.5}$ NAAQS violation determinations shall not be exclusively made based on data produced at a population-oriented SPM site during the first two complete years of its operation, but only if monitoring is not continued beyond those 2 years. More recently, during the development of the draft NAAMS and today's proposal, EPA has received input from various parties, including the Clear Air Act Advisory Committee, to the effect that EPA "should promote policies to avoid disincentives to monitoring" by limiting the regulatory use of data from such monitoring.[73] A moratorium on any use of data from the first 3 years after the deployment of a discretionary monitor, applicable to all NAAQS pollutants, was a specific approach discussed in some of our consultations with State and local monitoring officials during the development of this proposal. Such a moratorium would give States time to address the air quality problem with more flexibility than it would have if the area were designated nonattainment and subject to CAA requirements for nonattainment areas.

We understand and, to some degree, sympathize with the States' perception that the current requirements create disincentives to monitoring. We agree that it is conceivable, and perhaps likely, that it might ultimately be more protective of public health to have more monitoring data in hand even if the early years of data from each additional, discretionary monitor could not be used for regulatory purposes, compared to never having that data at all. However, we believe we may not ignore technically valid air quality data from FRM and FEM monitors when making attainment or nonattainment determinations. If we know that an area is actually not meeting an NAAQS based on valid data, we cannot ignore those data. This is premised on the provisions of the CAA that the Agency must follow in determining whether an area is attainment or nonattainment. Section 107(d)(1)(A)(i) of the CAA defines "nonattainment" as "any area that does not meet" an NAAQS and CAA section 107(d)(1)(A)(ii) defines "attainment" as any area "that meets" an NAAQS. In light of this explicit language, EPA does not believe we could affirmatively determine an area to be an attainment area for a particular criteria pollutant, (*i.e.*, an area "that attains" the NAAQS) if we had the requisite years of valid data from appropriately sited FRM or FEM monitors showing that the area was in fact not attaining the standard.

In light of this legal requirement, we believe that two limited exclusions on use of data from SPM are possible. We are proposing that: (1) The limited two-year moratorium on the use of data from SPM in determinations of NAAQS violations established in the 1997 rulemaking for $PM_{2.5}$ be extended to the annual PM_{10} NAAQS (if it is retained rather than revoked as proposed

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[72] A special purpose monitor (SPM) is one which the State does not count when showing compliance with the minimum requirements for the number and siting of monitors and which it has designated as an SPM by so labeling it in the Air Quality System (AQS) data system and/or in its monitoring plan. In common practice EPA does not overrule such designations provided the rest of the monitoring network meets minium requirements. Monitors carrying special purpose status need not use Federal reference or equivalent methods, are not subject to the quality system requirements of 40 CFR part 58 that apply to State and local air monitoring stations (SLAMS), and are not subject to siting requirements such as probe height or distance from nearby obstructions (or, in this proposal, the proposed siting suitability requirements for monitors which can be used for comparison with the proposed 24-hour $PM_{10-2.5}$ standard. Their data are not required to be submitted to AQS, and they may be discontinued at will by the State (assuming no grant commitment exists for their continued operation). States start up and designate monitors as special purpose as a flexible and economical way to meet various local monitoring objectives, such as exploring a possible air quality problem in response to citizen concerns.

[73] See recommendation 1.4 in Recommendations to the Clean Air Act Advisory Committee (CAAAC), Air Quality Management Workgroup, January 2005, transmitted by the CAAAC as a Committee recommendation to Administrator Michael O. Leavitt on January 19, 2005.

elsewhere in today's **Federal Register**), the O_3 NAAQS, and the proposed 24-hour $PM_{10\text{-}2.5}$ NAAQS, rather than any more extensive data exclusion approach; and (2) for CO, SO_2, NO_2, Pb, and 24-hour PM_{10}, that data from the first 2 years of a SPM would not be used for nonattainment designations but would be used in making findings of whether a nonattainment area has attained the NAAQS. In both cases, data from the first 2 years of operation of a new SPM would not be used provided the monitor does not continue operation beyond those 2 years. If the monitor does continue operation beyond 2 years, all years of data will be given full consideration. This policy would in some situations facilitate special purpose monitoring that would otherwise be discouraged by the risk of a nonattainment finding, but we acknowledge that these situations will be limited.

This proposed approach would have no practical effect for those NAAQS for which three consecutive years of data are always required before a determination of attainment/nonattainment can be made, *i.e.*, the 24-hour and annual $PM_{2.5}$ NAAQS, the annual PM_{10} NAAQS, the proposed $PM_{10\text{-}2.5}$ NAAQS, and the O_3 NAAQS. For these NAAQS, the proposed rule provision would make it clear that there is no risk of a nonattainment outcome based on a two-year period of SPM operation.

The CO, SO_2, NO_2, 24-hour PM_{10}, and Pb NAAQS present a different issue, because under the form of these NAAQS a single year of data can be sufficient to make a finding of nonattainment. We note that until such time as we revise one of these NAAQS, we are under no mandatory duty to designate an area from attainment or unclassifiable to nonattainment, so it is within our discretion to simply not take such an action if the critical data indicating nonattainment is from the first 2 years of an SPM.

However, if we are requested by a State to redesignate a nonattainment area to attainment, we do have a mandatory duty to act on that request. Consequently, we cannot overlook some SPM data that is contrary to the redesignation request by simply not taking an action. We must respond to a request for redesignation from nonattainment to attainment, and if there are valid data indicating that nonattainment still exists we could not approve the redesignation request. Therefore, we can use the fact that future designation of any new CO, SO_2, NO_2, 24-hour PM_{10}, or Pb nonattainment areas is discretionary to protect States from use of 2 years of data from a new SPM for one of these pollutants resulting in a nonattainment designation, but we cannot protect an area from use of such data in a finding on whether an already designated nonattainment area has subsequently attained the relevant NAAQS. Consequently, the proposed two-year data moratorium should remove the disincentive to place new monitors in attainment areas for CO, SO_2, NO_2, 24-hour PM_{10}, or Pb, but may leave in place disincentives to add monitors in nonattainment areas that may appear to have reached attainment or be approaching attainment.

Despite the limited nature of the proposed moratorium, States and other organizations would still be able to perform many useful types of discretionary monitoring without fear of triggering a near-term nonattainment designation. In the case of $PM_{2.5}$, PM_{10}, and the proposed $PM_{10\text{-}2.5}$ NAAQS, many of the most useful types of monitors for purposes of understanding the causes and possible solutions to a nonattainment problem are not FRM, FEM, or ARM monitors, and therefore these monitors can be deployed for two or even more years without any concern about use of the data in nonattainment designations. This includes a number of filter-based sampler models including the samplers used in the IMPROVE program, all types of speciation samplers for $PM_{2.5}$, PM_{10}, and the proposed $PM_{10\text{-}2.5}$, and all existing continuous monitors for $PM_{2.5}$. There are also non-FRM/FEM for some of the other NAAQS that currently can be deployed indefinitely to characterize air quality problems better without fear of nonattainment designation consequences (*e.g.*, passive monitors).

Another situation in which the limited nature of the proposed two-year moratorium would have no practical disincentive effect is when the siting of a monitor precludes comparison to the applicable NAAQS, even though it is an FRM or FEM monitor that meets quality system requirements. It could, for example, be placed in an location that is not ambient air and does not represent ambient air. It could also be placed inconsistently with siting criteria found in the rules which specify when monitoring data can be used for comparison with the NAAQS. See existing 40 CFR part 58, appendix D, section 2.8.1.2.3 and the suitability criteria proposed for the $PM_{10\text{-}2.5}$ monitoring network discussed in section IV.E.2 of this preamble.

The limited nature of the moratorium would have a disincentive effect on discretionary monitoring relative to a hypothetically more encompassing moratorium. For example, a State could still be discouraged from operating an O_3 or $PM_{2.5}$ monitor beyond 2 years, and thus may miss becoming aware of an actual public health problem. Therefore, we invite comment on the Agency's legal interpretation, which has shaped today's proposal for the described limited moratorium, and on what provisions for SPM data we should adopt if EPA was to change the legal interpretation in light of public comments. In particular, we invite comments on an approach in which the first 3 years of data from any SPM would be permanently protected from use in nonattainment determinations regardless of whether it operates beyond 3 years, but any monitor showing a violation in the first 3 years would be required to continue operation unless its discontinuation is approved as part of EPA's review of the State's annual monitoring plan. This approach would result in the State having some time to address the NAAQS violation before three usable years of data became available to make an official nonattainment/attainment determination from the fourth through sixth year of operation.

Special purpose monitors are presently not subject to the quality system requirements of 40 CFR part 58. With respect to data quality, EPA wishes to encourage all State and local monitoring agencies to adhere to the quality system requirements of 40 CFR part 58 for all FRM, FEM, and ARM monitors (the monitor types to which such requirements are applicable). Substandard quality system practices should not be deliberately used as a way to prevent EPA from using data from an SPM beyond the protection offered by the proposed two-year moratorium. However, under the current monitoring rules, States may do so and some have done so. Accordingly, EPA proposes to amend 40 CFR part 58 to require that all FRM, FEM, and ARM monitors operated by States (or delegated local agencies) comply with the quality system requirement in 40 CFR part 58 relevant to the monitor type(s) being used. We propose that this requirement take effect 2 years after the date of publication of the final rule, to provide States time to prepare to meet the requirement and to choose transition dates that fit with other network plans. We also invite comment on the alternative of using grant agreements to attempt to achieve quality system objectives for SPM instead of including a specific requirement in the proposed amendments.

We also propose that States be required to submit to the Air Quality System (AQS) all data collected by all FRM, FEM, and ARM special purpose monitors, starting no later than 2 years after the date of publication of the final amendments. In the past, when SPM were not required to follow quality system requirements, the uncertain data quality from such monitors was a reason to allow States discretion regarding submission of data to AQS. With the proposed requirement that FRM, FEM, and ARM special purpose monitors follow quality system requirements, there is no rationale for their data not being submitted to AQS to provide transparency in the air quality management process.

We propose to retain and clarify that a State may discontinue use of an SPM at any time, without need for EPA approval. However, we encourage States to continue the use of monitors that have gone beyond the two-year point of operation if they have recorded a violation of a NAAQS. Otherwise, EPA may designate the area as nonattainment and the State would lack clear evidence to show subsequent attainment.

10. Flexibility and Resources for Non-Required Monitoring

The EPA wishes to clarify that while 40 CFR part 58, including the proposed amendments, contains a number of minimum requirements for States to operate ambient monitors, ensure data quality, and report data, these requirements are not a complete blueprint for the monitoring networks that we believe should and we hope will be operated by State and local agencies. Many specific features of minimum requirements for these networks, such as selection of specific monitoring sites for $PM_{10\text{-}2.5}$, are left to be made later at the State level with EPA Regional Office approval, so that the best information and local insights can be applied to deciding those features. Also, not every type of monitoring that is needed can be required through the provisions of 40 CFR part 58 in this rulemaking because, in some cases, the specific State that should be responsible for a monitoring activity cannot be identified with confidence at this time. For example, the proposed amendments to 40 CFR part 58 do not require any State to operate a rural NCore multipollutant NCore monitoring station, even though we estimate that the Nation needs about 20 such sites, because it would be premature and too rigid at this time to select those sites. Instead, we will work with States as they determine the location of their required urban NCore multipollutant site or sites, and we will most likely negotiate for the voluntary operation of some rural sites as well.

The provisions of 40 CFR part 58 can and should only require the number and types of monitoring activities that will surely be needed in any State over a reasonably long time period, to avoid the need for frequent amendments to allow States to stop the use of obsolete monitors. However, aggregation of hypothetical State networks that just met the minimum requirements of 40 CFR part 58, including the proposed amendments, would be inadequate to meet the needs of air quality management at the State and national levels. We will negotiate with States for monitoring activities that go beyond the minimum requirements of 40 CFR part 58 using the draft National Ambient Air Monitoring Strategy as a starting point for those negotiations. The EPA will generally provide at least partial funding for such additional monitoring through grants, sometimes very specifically and sometimes though more general air quality management support grants. Where current monitoring activities by a State exceed the final minimum requirements in 40 CFR part 58, EPA may need to negotiate reductions in is funding for those activities if the data they produce are not sufficiently valuable to the air quality management process.

In particular, we anticipate that we will be negotiating with States in the next several years the specifics of the following directional changes in their networks:

- Creation and operation of rural NCore multipollutant stations. We expect that some of the need for rural monitoring data can be met by required stations that some states choose to place in suitable rural areas and/or by planned federally-operated rural monitoring stations. We will identify the remaining needed sites and recruit and fund specific States to establish and operate them.
- Creation and operation of more $PM_{10\text{-}2.5}$ speciation sites than the minimum required in the proposed amendments.
- Creation and operation of rural $PM_{10\text{-}2.5}$ mass concentration sites. In addition to the urban $PM_{10\text{-}2.5}$ sites required by this proposal, having some $PM_{10\text{-}2.5}$ mass concentration sites in rural areas may be useful to provide ambient data to compare with the higher coarse particle concentrations that are typically found in urban locations. Since these rural sites would typically be located outside of any MSA and would be characterized by lower population densities than in metropolitan areas, most would likely not be appropriate for NAAQS comparisons. We may work with selected States to establish such rural sites, taking into account existing siting opportunities such as the CASTNET and IMPROVE networks, and we solicit comment on the need for and siting strategy for such rural monitors. We note that monitoring sites in rural areas may be useful in future health effects research.
- Reduction in the number of $PM_{2.5}$ filter-based monitors and replacement of some such monitors with continuous instruments.
- Reduction in the number of CO, SO_2, NO_2, PM_{10}, and Pb monitoring sites.
- Changes in the number and/or locations of $PM_{2.5}$ speciation monitoring sites. The EPA and the States have been assessing these sites in the last year or so, and some changes are underway. A new factor to consider will be the speciation data needs of areas that may now be attaining the current $PM_{2.5}$ NAAQS but appear likely to be nonattainment with the proposed NAAQS.
- Changes in PAMS networks. The proposed minimum requirements for PAMS monitoring would mean that many current State networks exceed minimum requirements, providing the opportunity for reassessment and redesign to better meet local conditions and data needs.
- Other changes that would result in networks that better meet State data goals, which can be so individualistic that they cannot be given consideration in a rulemaking such as this, or even in a nonbinding national strategy.

11. Proposed Requirements for Network Assessments

In addition to annual network reviews, EPA proposes to require periodic and detailed network assessments as a way to maintain relevancy of ambient air monitoring to emerging air program needs and scientific findings. The EPA proposes that State and local agencies conduct a technical network assessment every 5 years to consider whether stations should be removed or added, or whether new program elements should be adopted to account for changes in air quality, population growth, emission sources, and other parameters. The first assessments would be due July 1, 2009. These assessments would also evaluate the adequacy of existing technologies deployed in the network compared to commercially available methods that could potentially be deployed to improve the network. Network assessments are intended to probe the current and expected relevancy of air monitoring networks through a combination of stakeholder participation and technical analyses. This would be accomplished, in part, by periodically questioning the overall usefulness of the existing sites and identifying locations where additional monitoring may be necessary. Typical topics addressed in network assessments would include reviewing data objectives and data quality, prioritizing measurement needs, identifying redundant monitoring, and identifying specific gaps in location and measurement parameters. The EPA anticipates developing non-binding guidance on how to conduct these proposed network assessments. We solicit comment on the proposed requirements and schedule for network assessments.

12. Related Federal Monitoring

The EPA conducts or supports three ambient monitoring programs directly, related to but separate from, the State, local, and tribal monitoring programs that are the subject of today's proposal. These are CASTNET, NADP, and IMPROVE programs, described in section III.B.3 of this preamble. Today's proposals do not apply to these programs, but the following brief description of these programs may assist the public in commenting on today's proposal.

The EPA plans to upgrade the monitoring capabilities of many of the CASTNET sites in the next couple of years in ways that would allow them to meet the same multipollutant monitoring objectives as the proposed State-operated rural NCore stations. As these plans become more developed, EPA expects to adjust its targets for the number of rural NCore stations that are voluntarily operated by States under grant agreements with EPA.

The EPA is exploring with the National Atmospheric Deposition Network (NADP) sponsors the possibility of expanding NADP's objectives and monitoring infrastructure to investigate measurement of spatial monitoring concentrations, from which dry deposition could be estimated. Also, NADP stations potentially provide efficient opportunities to site ambient air monitors for other purposes.

At present, the IMPROVE program employs different sampling hardware and laboratory analytical procedures to measure speciated $PM_{2.5}$ compared to most $PM_{2.5}$ speciation monitoring in urban areas. The EPA is working to achieve more consistency between the two programs, so that monitoring results at the two types of stations are more directly comparable. We are also reviewing the current IMPROVE site list to determine which are of higher versus lower priority for long-term continuation.

F. What Are the Proposed Probe and Monitoring Path Siting Criteria?

The EPA is proposing minor organizational changes to 40 CFR 58, appendix E (Probe and Monitoring Path Siting Criteria for Ambient Air Quality Monitoring). The EPA also is proposing specific criteria for the placement of $PM_{10\text{-}2.5}$ samplers. Current vertical placement requirements permit microscale PM_{10} and $PM_{2.5}$ monitors to be located 2 to 7 meters above ground level to allow for security, instrument servicing, and operator safety, as well as sampling particulate matter at the breathing height. The EPA is proposing that the same 2- to 7-meter vertical placement requirements apply to microscale $PM_{10\text{-}2.5}$ sites.[74] The EPA is also proposing that the 2- to 7-meter vertical placement requirement apply to middle-scale $PM_{10\text{-}2.5}$ sites, which differs from the existing $PM_{2.5}$ vertical placement requirement permitting middle-scale sites to have samplers placed 2 to 15 meters above ground. We recognize that significant $PM_{10\text{-}2.5}$ vertical concentration gradients may exist due to re-entrainment of coarse particles from the surfaces that typically surround monitoring sites, such as adjacent streets, parking lots, and landscaped surfaces, and such vertical gradients may introduce additional complexities in the comparison of data from samplers at widely varying heights. The EPA seeks to reduce this variability by restricting the vertical placement of $PM_{10\text{-}2.5}$ samplers at middle-scale sites to the 2 to 7 meter requirement while recognizing that $PM_{10\text{-}2.5}$ monitors that would have been at a higher level (e.g., 15 meters above ground) would have likely measured lower ambient concentrations. The EPA proposes that $PM_{10\text{-}2.5}$ sites with neighborhood, urban, and regional scales have identical horizontal and vertical requirements with $PM_{2.5}$ sites in consideration of the lesser gradients of coarse particle ambient concentrations likely with sites representing larger, more homogeneous conditions. The EPA acknowledges the logistical complexity of having different vertical placement requirements for middle-scale $PM_{10\text{-}2.5}$ and $PM_{2.5}$ sites, and solicits comment on all aspects of $PM_{10\text{-}2.5}$ probe siting criteria.

Motor vehicle nitric oxide emissions are known to scavenge ozone, and EPA recognizes the difficulty that monitoring agencies face when trying to locate ozone air monitors in areas with multiple roadways and streets. Based upon concern about the scavenging effects of motor vehicle emissions on ozone, EPA proposes to increase the minimum distances between ozone monitors and roadways in certain cases. Recent field studies have shown significant effects of roadway emissions at the distances currently listed in 40 CFR part 58, appendix E. Summary information on this work is included in the docket for this proposal. The EPA solicits comments on these proposed minimum distance requirements.

G. What Are the Proposed Data Reporting, Data Certification, and Sample Retention Requirements?

1. Reduction of $PM_{2.5}$ Supplemental Data Reporting Requirements

The EPA is proposing to reduce the data reporting requirements associated with $PM_{2.5}$ Federal Reference Methods (FRM) to reduce the data management burden for monitoring agencies. The following Air Quality System (AQS) reporting requirements are proposed for elimination: Maximum and minimum ambient temperature, maximum and minimum ambient pressure, flow rate coefficient of variation (C_V), total sample volume, and elapsed sample time. AQS reporting requirements are being retained for average ambient temperature and average ambient pressure, and any applicable sampler flags.

Supplemental monitoring parameters were required to be reported to AQS along with FRM mass concentration data to evaluate the performance of the FRM as implemented through the newly developed sampler hardware that was purchased by EPA for State and local agencies at the beginning of the $PM_{2.5}$ monitoring program. Since that time, these supplemental data, along with statistical analyses conducted on data from collocated sampling and independent Performance Evaluation Program (PEP) audits, have confirmed that the $PM_{2.5}$ FRM samplers are producing data that meet or exceed the data quality objectives developed for the method. As a result, the AQS reporting requirement for many of the supplemental data parameters can be discontinued with no adverse effect on $PM_{2.5}$ data quality. Monitoring agencies would still be expected to retain supplemental data as required by their

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[74] The proposed network design criteria for $PM_{10\text{-}2.5}$ would consider such data to be ineligible for comparison to the NAAQS (see preamble section IV.E.2.B.ii).

approved Quality Assurance Program Plans (QAPP).

AQS reporting requirements for average ambient temperature and average ambient pressure are being retained to provide data useful for the comparison of mass concentrations based on actual and standard operating conditions.

EPA is also proposing amendments to 40 CFR 58.16 (Data submittal) to add the remaining $PM_{2.5}$ supplemental data reporting requirements, which presently are only found in the FRM requirements (Table L–1 of appendix L of part 50). This change will ensure that supplemental data are reported for future $PM_{2.5}$ samplers designated as a Class I or Class II Federal equivalent method under the proposed amendments to 40 CFR part 53.

2. $PM_{2.5}$ Field Blank Data Reporting Requirement

We are proposing amendments to 40 CFR part 58.16 to require the submission of data on $PM_{2.5}$ field blank mass in addition to $PM_{2.5}$ filter-based measurements. Field blanks are filters which are handled in the field as much as possible like actual filters except that ambient air is not pumped through them, to help quantify contamination and sampling artifacts. Only the data from field blanks which States are already taking into the field and weighing in their laboratories would be required to be reported under this proposal. Quantifying field blank mass is important in order to complete the material balance of the major components of sampled $PM_{2.5}$. In addition, fluctuations of the field blank value are a useful quality control metric which can be used to help evaluate the performance of filter-based samplers and the quality of the sampled $PM_{2.5}$ values. However, there is currently limited information available to EPA and other users of ambient air quality data on the magnitude and trends in the blank concentrations from $PM_{2.5}$ Federal reference method (FRM) samplers. These data are produced by State and local air pollution agencies on a regular basis throughout the year, but the data are not currently submitted to EPA. Having the data from these field blanks available to the national monitoring community would help EPA and other researchers better understand the relationship between the mass of PM that is sampled and weighed on a regular PM filter and the PM that is actually present in ambient air. The EPA solicits comment on this additional $PM_{2.5}$ reporting requirement.

3. Data Certification Schedule

To enhance timely certification of each year's air quality data to allow more timely reporting to the public and more timely regulatory findings and actions based on those data, EPA proposes to speed up official certification of air quality data by moving the annual data certification date from July 1 to May 1 of each year. We believe it can be met through more expeditious administrative clearance processes with State/local agencies and will not require significant changes in monitoring practices or equipment. The EPA solicits comments on this proposed change to the certification schedule. The EPA solicits comments identifying possible barriers to meeting the proposed certification date and information on how agencies that presently certify their data ahead of the current schedule accomplish this.

4. Particulate Matter Filter Archive

During the regulatory development process, various governmental agencies and health scientists indicated that archiving particulate matter filters for FRM and Federal equivalent methods would be useful for later chemical speciation analyses, mass analyses, or other analyses. Therefore, we propose to require archiving $PM_{2.5}$, $PM_{10-2.5}$, and PM_{10C} filters for one year (the current requirement is only for $PM_{2.5}$ filters). The EPA solicits comment on this proposed requirement, specifically from those agencies or scientists interested in using these filters.

V. Statutory and Executive Order Reviews

A. Executive Order 12866: Regulatory Planning and Review

Under Executive Order 12866 (58 FR 51735, October 4, 1993), EPA must determine whether the regulatory action is ''significant'' and therefore subject to review by the Office of Management and Budget (OMB) and to the requirements of the Executive Order. The Executive Order defines a ''significant regulatory action'' as one that is likely to result in a rule that may:

(1) Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities;

(2) Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

(3) Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or

(4) Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

Pursuant to the terms of Executive Order 12866, OMB has notified EPA that it considers this a ''significant regulatory action'' within the meaning of the Executive Order. EPA has submitted this action to OMB for review. Changes made in response to OMB suggestions or recommendations will be documented in the public record.

B. Paperwork Reduction Act

The information collection requirements in the proposed rule have been submitted for approval to the Office of Management and Budget (OMB) under the Paperwork Reduction Act, 44 U.S.C. 3501 *et seq.* The Information Collection Request (ICR) documents prepared by EPA have been assigned EPA ICR No. 0559.09 (2080–0005) for 40 CFR part 53 and 0940.19 (2060–0084) for 40 CFR part 58. The provisions in 40 CFR parts 53 and 58 have been previously approved by OMB under control numbers 2080–0005 (EPA ICR number 0559.07) and 2060–0084 (EPA ICR number 0940.17), respectively.

The monitoring, record keeping, and reporting requirements in 40 CFR parts 53 and 58 are specifically authorized by section 319 of the CAA (42 U.S.C. 7619). All information submitted to EPA pursuant to the monitoring, record keeping, and reporting requirements for which a claim of confidentiality is made is safeguarded according to Agency policies in 40 CFR part 2, subpart B.

The information collected under 40 CFR part 53 (e.g., test results, monitoring records, instruction manual, and other associated information) is needed to determine whether a candidate method intended for use in determining attainment of the National Ambient Air Quality Standards (NAAQS) in 40 CFR part 50 will meet the design, performance, and/or comparability requirements for designation as a Federal reference method (FRM) or Federal equivalent method (FEM). The proposed amendments would add requirements for $PM_{10-2.5}$ FEM and FRM determinations, Class II equivalent methods for $PM_{10-2.5}$ and Class III equivalent methods for $PM_{2.5}$ and $PM_{10-2.5}$; reduce certain monitoring and data collection requirements; and streamline EPA administrative requirements.

The incremental annual reporting and record keeping burden for this collection of information under 40 CFR part 53 (averaged over the first 3 years of this ICR) for one additional respondent per year is estimated to increase by a total of 2,774 labor hours per year with an increase in costs of $32,000/year. The capital/startup costs for test equipment and qualifying tests are estimated at $3,832 with operation and maintenance costs of $27,772.

The information collected and reported under 40 CFR part 58 is needed to determine compliance with the NAAQS, to characterize air quality and associated health and ecosystems impacts, to develop emission control strategies, and to measure progress for the air pollution program. The proposed amendments would revise the technical requirements for certain types of sites, add provisions for monitoring of $PM_{10\text{-}2.5}$, and reduce certain monitoring requirements for criteria pollutants of than particulate matter and ozone. Monitoring agencies would be required to submit annual monitoring network plans, establish $PM_{2.5}$ sites by January 1, 2009, establish NCore sites by January 1, 2011, conduct network assessments every 5 years, and perform quality assurance activities.

The annual average reporting burden for the collection under 40 CFR part 58 (averaged over the first 3 years of this ICR) for 168 respondents is estimated to decrease by a total of 336,650 labor hours per year with a decrease in costs of $31,600,362. State, local, and tribal entities are eligible for State assistance grants provided by the Federal government under the CAA for monitors and related activities.

Burden means the total time, effort, or financial resources expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal agency. This includes the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to a collection of information; search data sources; complete and review the collection of information; and transmit or otherwise disclose the information.

An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. The OMB control numbers for EPA's regulations in 40 CFR parts 53 and 58 are listed in 40 CFR part 9.

To comment on the Agency's need for the information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including the use of automated collection techniques, EPA has established a public docket for the proposed amendments, which includes the ICR for 40 CFR part 58, under Docket ID number EPA–HQ–OAR–2004–0018. Submit any comments related to the ICR for the proposed amendments to 40 CFR part 58 to EPA and OMB. See the **ADDRESSES** section at the beginning of this notice for where to submit comments to EPA. Send comments to OMB at the Office of Information and Regulatory Affairs, Office of Management and Budget, 725 17th Street, NW., Washington, DC 20503, Attention: Desk Office for EPA. Since OMB is required to make a decision concerning the ICR between 30 and 60 days after January 17, 2006, a comment to OMB is best assured of having its full effect if OMB receives it by February 16, 2006. The final amendments will respond to any OMB or public comments on the information collection requirements for 40 CFR part 58 contained in this proposal.

C. Regulatory Flexibility Act

The Regulatory Flexibility Act generally requires an agency to prepare a regulatory flexibility analysis of any rule subject to notice and comment rulemaking requirements under the Administrative Procedure Act or any other statute unless the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. Small entities include small businesses, small not-for-profit enterprises, and small governmental jurisdictions.

For the purposes of assessing the impacts of today's proposed amendments on small entities, small entity is defined as: (1) A small business as defined by the Small Business Administration; (2) a government jurisdiction that is a government of a city, county, town, school district or special district with a population of less than 50,000; and (3) a small organization that is any not-for-profit enterprise which is independently owned and operated and that is not dominant in its field.

After considering the economic impacts of today's proposed amendments on small entities, I certify that this action will not have a significant economic impact on a substantial number of small entities. The proposed requirements in 40 CFR part 53 for applications for designation of equivalent methods do not address small entities. The requirement to apply is voluntary and, the criteria for approval are the minimum necessary to ensure that alternative methods meet the same technical standards as the proposed federal method. The proposed amendments to 40 CFR part 58 would reduce annual ambient air monitoring costs for State and local agencies by approximately $8.5 million and 40,000 labor hours from present levels. State assistance grant funding provided by the federal government can be used to defray the costs of new or upgraded monitors for the NCore and $PM_{10\text{-}2.5}$ networks. We continue to be interested in the potential impacts of the proposed amendments on small entities and welcome comments on issues related to such impacts.

D. Unfunded Mandates Reform Act

Title II of the Unfunded Mandates Reform Act of 1995 (UMRA), Public Law 104–4, establishes requirements for Federal agencies to assess the effects of their regulatory actions on State, local, and Tribal governments and the private sector. Under section 202 of the UMRA, EPA generally must prepare a written statement, including a cost-benefit analysis, for proposed and final rules with ''Federal mandates'' that may result in expenditures to State, local, and Tribal governments, in the aggregate, or to the private sector, of $100 million or more in any one year. Before promulgating an EPA rule for which a written statement is needed, section 205 of the UMRA generally requires EPA to identify and consider a reasonable number of regulatory alternatives and adopt the least costly, most cost-effective or least burdensome alternative that achieves the objectives of the rule. The provisions of section 205 do not apply when they are inconsistent with applicable law. Moreover, section 205 allows EPA to adopt an alternative other than the least costly, most cost-effective or least burdensome alternative if the Administrator publishes with the final rule an explanation why that alternative was not adopted. Before EPA establishes any regulatory requirements that may significantly or uniquely affect small governments, including Tribal governments, it must have developed under section 203 of the UMRA a small government agency plan. The plan must provide for notifying potentially affected small governments, enabling officials of affected small governments to have meaningful and timely input in the development of EPA regulatory proposals with significant Federal intergovernmental mandates, and informing, educating, and advising small governments on compliance with the regulatory requirements.

EPA has determined that the proposed rule does not contain a Federal mandate that may result in expenditures of $100 million or more for State, local, and Tribal governments, in the aggregate, or the private sector in any one year. The proposed amendments to 40 CFR part 58 would reduce annual ambient air monitoring costs for State and local agencies by approximately $8.5 million and 40,000 labor hours from present levels. The costs for reconfiguring the existing ambient air monitoring requirements to implement the NCore network would be borne by the Federal government in the form of State assistance grants. Thus, the proposed amendments are not subject to the requirements of sections 202 and 205 of the UMRA.

EPA has determined that the proposed rule contains no regulatory requirements that might significantly or uniquely affect small governments. Small governments that may be affected by the proposed amendments are already meeting similar requirements under the existing rules, the proposed amendments would substantially reduce the costs of the existing rules, and the costs of changing the network design requirements would be borne by the Federal government through State assistance grants. Therefore, the proposed rule is not subject to the requirements of section 203 of the UMRA.

E. Executive Order 13132: Federalism

Executive Order 13132 (64 FR 43255, August 10, 1999), requires EPA to develop an accountable process to ensure ‘‘meaningful and timely input by State and local officials in the development of regulatory policies that have federalism implications.’’ ‘‘Policies that have federalism implications’’ is defined in the Executive Order to include regulations that have ‘‘substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.’’

This proposed rule does not have federalism implications. It will not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government, as specified in Executive Order 13132. States currently implement similar ambient air monitoring requirements under 40 CFR parts 53 and 58, and the costs of implementing new requirements would be borne by the Federal government through State assistance grants. Thus, Executive Order 13132 does not apply to this proposed rule.

Although section 6 of the Executive Order does not apply to this proposed rule, EPA did consult with representatives of State and local governments early in the process of developing this proposed rule. In 2001, EPA organized a National Monitoring Steering Committee (NMSC) to provide oversight and guidance in reviewing the existing air pollution monitoring program and in developing a comprehensive national ambient air monitoring strategy. The NMSC membership includes representatives EPA, State and local agencies, State and Territorial Air Pollution Program Administrators/Association of Local Air Pollution Control Officials (STAPPA/ALAPCO), and tribal governments to reflect the partnership between EPA and governmental agencies that collect and use ambient air data. The NMSC formed workgroups to address quality assurance, technology, and regulatory review of the draft ambient air monitoring strategy (NAAMS). These workgroups met several times by phone and at least once in a face-to-face workshop to detail out recommendations for improving the ambient air monitoring program. A record of the Steering Committee members, workgroup members, and workshop are available on the web at: *http://www.epa.gov/ttn/amtic/monitor.html.*

In the spirit of Executive Order 13132, and consistent with EPA policy to promote communications between EPA and State and local governments, EPA specifically solicits comments on the proposed rule from State and local officials.

F. Executive Order 13175: Consultation and Coordination With Indian Tribal Governments

Executive Order 13175, entitled ‘‘Consultation and Coordination with Indian Tribal Governments’’ (65 FR 67249, November 9, 2000), requires EPA to develop an accountable process to ensure ‘‘meaningful and timely input by tribal officials in the development of regulatory policies that have tribal implications.’’ This proposed rule does not have tribal implications, as specified in Executive Order 13175. The proposed amendments would not directly apply to Tribal governments. However, a tribal government may elect to conduct ambient air monitoring and report the data to AQS. Since it is possible that tribal governments may choose to establish and operate NCore sites as part of the national monitoring program, EPA consulted with tribal officials early in the process of developing the proposed rule to permit them to have meaningful and timely input into its development. As discussed in section V.E of this preamble, tribal agencies were represented on both the NMSSC and the workgroups that developed the NAAMS document and proposed monitoring requirements. Tribal monitoring programs were represented on both the Quality Assurance and Technology work groups. Participation was also open to tribal monitoring programs on the regulatory review workgroup. EPA specifically solicits additional comment on the proposed amendments from tribal officials.

G. Executive Order 13045: Protection of Children From Environmental Health and Safety Risks

Executive Order 13045 (62 FR 19885, April 23, 1997) applies to any rule that: (1) Is determined to be ‘‘economically significant’’ as defined under Executive Order 12866, and (2) concerns an environmental health or safety risk that EPA has reason to believe may have a disproportionate effect on children. If the regulatory action meets both criteria, the Agency must evaluate the environmental health or safety effects of the planned rule on children, and explain why the planned regulation is preferable to other potentially effective and reasonably feasible alternatives considered by the Agency.

EPA interprets Executive Order 13045 as applying only to those regulatory actions that are based on health or safety risks, such that the analysis required under section 5–501 of the Order has the potential to influence the regulation. The proposed rule is not subject to Executive Order 13045 because it is based on technology and not on health or safety risks.

H. Executive Order 13211: Actions That Significantly Affect Energy Supply, Distribution, or Use

The proposed rule is not a ‘‘significant energy action’’ as defined in Executive Order 13211, ‘‘Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution or Use’’ (66 FR 28355, May 22, 2001) because it is not likely to have a significant adverse effect on the supply, distribution, or use of energy. No significant change in the use of energy is expected because the total number of monitors for ambient air quality measurements will not increase above present levels. Further, we have concluded that this proposed rule is not likely to have any adverse energy effects.

I. National Technology Transfer Advancement Act

Section 12(d) of the National Technology Transfer Advancement Act of 1995 (NTTAA), Public Law 104–113, section 12(d) (15 U.S.C. 272 note) directs EPA to use voluntary consensus standards in its regulatory activities unless to do so would be inconsistent with applicable law or otherwise impractical. Voluntary consensus standards are technical standards (e.g., materials specifications, test methods, sampling procedures, and business practices) that are developed or adopted by voluntary consensus standards bodies. The NTTAA directs EPA to provide Congress, through OMB, explanations when the Agency decides not to use available and applicable voluntary consensus standards.

The proposed amendments involve environmental monitoring and measurement. Ambient air concentrations of $PM_{2.5}$ are currently measured by the Federal reference method in 40 CFR part 50, appendix L (Reference Method for the Determination of Fine Particulate as $PM_{2.5}$ in the Atmosphere) or by an a Federal reference or equivalent method that meets the requirements in 40 CFR part 53. Ambient air concentrations of $PM_{10\text{-}2.5}$ would be measured by the proposed Federal reference method in 40 CFR part 50, appendix O (Reference Method for the Determination of Coarse Particulate Matter as $PM_{10\text{-}2.5}$ in the Atmosphere) published elsewhere in this **Federal Register** or by a Federal reference or equivalent method that meets the requirements in 40 CFR part 53. As discussed in section IV.B of this preamble, the proposed Federal reference method for $PM_{10\text{-}2.5}$ is similar to the existing methods for $PM_{2.5}$ and PM_{10}.

In the preamble to the proposed NAAQS revisions published elsewhere in this **Federal Register**, EPA requests comments on selection of an alternative filter-based dichotomous sampler as the Federal reference method for $PM_{10\text{-}2.5}$. Procedures are included in the proposed monitoring amendments that would allow for approval of a candidate equivalent method for $PM_{10\text{-}2.5}$ that is similar to the proposed Federal reference method or to the alternative method proposed for comment. Any method that meets the performance criteria for a candidate equivalent method could be approved for use as a Federal reference or equivalent method.

This approach is consistent with the Agency's Performance-Based Measurement System (PBMS). The PBMS approach is intended to be more flexible and cost effective for the regulated community; it is also intended to encourage innovation in analytical technology and improved data quality. EPA is not precluding the use of any method, whether it constitutes a voluntary consensus standard or not, as long as it meets the specified performance criteria. EPA welcomes comments on this aspect of the proposed amendments and, specifically invites the public to identify potentially applicable voluntary consensus standards and to explain why such standards should be used in the regulation.

J. Executive Order 12898: Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations

Executive Order 12848 (58 FR 7629, February 11, 1994) requires that each Federal agency make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minorities and low-income populations. These requirements have been addressed to the extent practicable in the Regulatory Impact Analysis for the proposed revisions to the NAAQS for particulate matter.

List of Subjects in 40 CFR Parts 53 and 58

Environmental protection, Administrative practice and procedure, Air pollution control, Intergovernmental relations, Reporting and recordkeeping requirements.

Dated: December 20, 2005.

Stephen L. Johnson,

Administrator.

For the reasons set out in the preamble, title 40, chapter I, parts 53 and 58 of the Code of Federal Regulations are proposed to be amended as follows:

PART 53—[AMENDED]

1. The authority citation for part 53 continues to read as follows:

Authority: Sec. 301(a) of the Clean Air Act (42 U.S.C. sec. 1857g(a)), as amended by sec. 15(c)(2) of Pub. L. 91–604, 84 Stat. 1713, unless otherwise noted.

Subpart A—[Amended]

2. Revise §§ 53.1 through 53.5 to read as follows:

§ 53.1 Definitions.

Terms used but not defined in this part shall have the meaning given them by the Act.

Act means the Clean Air Act (42 U.S.C. 1857–1857l), as amended.

Additive and multiplicative bias means the linear regression intercept and slope of a linear plot fitted to corresponding candidate and reference method mean measurement data pairs.

Administrator means the Administrator of the Environmental Protection Agency (EPA) or his or her authorized representative.

Agency means the Environmental Protection Agency.

Applicant means a person or entity who submits an application for a reference or equivalent method determination under § 53.4, or a person or entity who assumes the rights and obligations of an applicant under § 53.7. Applicant may include a manufacturer, distributor, supplier, or vendor.

Automated method or analyzer means a method for measuring concentrations of an ambient air pollutant in which sample collection (if necessary), analysis, and measurement are performed automatically by an instrument.

Candidate method means a method for measuring the concentration of an air pollutant in the ambient air for which an application for a reference method determination or an equivalent method determination is submitted in accordance with § 53.4, or a method tested at the initiative of the Administrator in accordance with § 53.7.

Class I equivalent method means an equivalent method for $PM_{2.5}$ or $PM_{10\text{-}2.5}$ which is based on a sampler that is very similar to the sampler specified for reference methods in appendix L or appendix O (as applicable) of part 50 of this chapter, with only minor deviations or modifications, as determined by EPA.

Class II equivalent method means an equivalent method for $PM_{2.5}$ or $PM_{10\text{-}2.5}$ that utilizes a $PM_{2.5}$ sampler or $PM_{10\text{-}2.5}$ sampler in which integrated $PM_{2.5}$ samples or $PM_{10\text{-}2.5}$ samples are obtained from the atmosphere by filtration and subjected to a subsequent filter conditioning process followed by a gravimetric mass determination, but which is not a Class I equivalent method because of substantial deviations from the design specifications of the sampler specified for reference methods in appendix L or appendix O (as applicable) of part 50 of this chapter, as determined by EPA.

Class III equivalent method means an equivalent method for $PM_{2.5}$ or $PM_{10-2.5}$ that is an analyzer capable of providing $PM_{2.5}$ or $PM_{10-2.5}$ ambient air measurements representative of one-hour or less integrated $PM_{2.5}$ or $PM_{10-2.5}$ concentrations as well as 24-hour measurements determined as, or equivalent to, the mean of 24 one-hour consecutive measurements.

CO means carbon monoxideide.

Collocated means two or more air samplers, analyzers, or other instruments that are operated simultaneously while located side by side, separated by a distance that is large enough to preclude the air sampled by any of the devices from being affected by any of the other devices, but small enough so that all devices obtain identical or uniform ambient air samples that are equally representative of the general area in which the group of devices is located.

Equivalent method means a method for measuring the concentration of an air pollutant in the ambient air that has been designated as an equivalent method in accordance with this part; it does not include a method for which an equivalent method designation has been canceled in accordance with § 53.11 or § 53.16.

ISO 9001-registered facility means a manufacturing facility that is either:

(1) An International Organization for Standardization (ISO) 9001-registered manufacturing facility, registered to the ISO 9001 standard (by the Registrar Accreditation Board (RAB) of the American Society for Quality Control (ASQC) in the United States), with registration maintained continuously.

(2) A facility that can be demonstrated, on the basis of information submitted to the EPA, to be operated according to an EPA-approved and periodically audited quality system which meets, to the extent appropriate, the same general requirements as an ISO 9001-registered facility for the design and manufacture of designated reference and equivalent method samplers and monitors.

ISO-certified auditor means an auditor who is either certified by the Registrar Accreditation Board (in the United States) as being qualified to audit quality systems using the requirements of recognized standards such as ISO 9001, or who, based on information submitted to the EPA, meets the same general requirements as provided for ISO-certified auditors.

Manual method means a method for measuring concentrations of an ambient air pollutant in which sample collection, analysis, or measurement, or some combination thereof, is performed manually. A method for PM_{10} or $PM_{2.5}$ which utilizes a sampler that requires manual preparation, loading, and weighing of filter samples is considered a manual method even though the sampler may be capable of automatically collecting a series of sequential samples.

NO means nitrogen oxide.

NO_2 means nitrogen dioxide.

NO_X means oxides of nitrogen and is defined as the sum of the concentrations of NO_2 and NO.

O_3 means ozone.

Operated simultaneously means that two or more collocated samplers or analyzers are operated concurrently with no significant difference in the start time, stop time, and duration of the sampling or measurement period.

Pb means lead.

PM means PM_{10}, PM_{10C}, $PM_{2.5}$, $PM_{10-2.5}$, or particulate matter of unspecified size range.

PM_{10} means particulate matter as defined in section 1.1 of appendix J to part 50 of this chapter.

$PM_{2.5}$ means particulate matter as defined in section 1.1 of appendix L to part 50 of this chapter.

$PM_{10-2.5}$ means particulate matter as defined in section 1.1 of appendix O to part 50 of this chapter.

PM_{10C} means PM_{10} particulate matter or PM_{10} measurements obtained with a PM_{10C} sampler.

$PM_{2.5}$ sampler means a device, associated with a manual method for measuring $PM_{2.5}$, designed to collect $PM_{2.5}$ from an ambient air sample, but lacking the ability to automatically analyze or measure the collected sample to determine the mass concentrations of $PM_{2.5}$ in the sampled air.

PM_{10} sampler means a device, associated with a manual method for measuring PM_{10}, designed to collect PM_{10} from an ambient air sample, but lacking the ability to automatically analyze or measure the collected sample to determine the mass concentrations of PM_{10} in the sampled air.

PM_{10C} sampler means a PM_{10} sampler that meets the special requirements for a PM_{10C} sampler that is part of a $PM_{10-2.5}$ reference method sampler, as specified in appendix O to part 50 of this chapter, or a PM_{10} sampler that is part of a $PM_{10-2.5}$ sampler that has been designated as an equivalent method for $PM_{10-2.5}$.

$PM_{10-2.5}$ sampler means a sampler, or a collocated pair of samplers, associated with a manual method for measuring $PM_{10-2.5}$ and designed to collect either $PM_{10-2.5}$ directly or PM_{10C} and $PM_{2.5}$ separately and simultaneously from concurrent ambient air samples, but lacking the ability to automatically analyze or measure the collected sample(s) to determine the mass concentrations of $PM_{10-2.5}$ in the sampled air.

Reference method means a method of sampling and analyzing the ambient air for an air pollutant that is specified as a reference method in an appendix to part 50 of this chapter, or a method that has been designated as a reference method in accordance with this part; it does not include a method for which a reference method designation has been canceled in accordance with § 53.11 or § 53.16.

Sequential samples for PM samplers means two or more PM samples for sequential (but not necessarily contiguous) time periods that are collected automatically by the same sampler without the need for intervening operator service.

SO_2 means sulfur dioxide.

Test analyzer means an analyzer subjected to testing as part of a candidate method in accordance with subparts B, C, D, E, or F of this part, as applicable.

Test sampler means a PM_{10} sampler, $PM_{2.5}$ sampler, or $PM_{10-2.5}$ sampler subjected to testing as part of a candidate method in accordance with subparts C, D, E, or F of this part.

Ultimate purchaser means the first person or entity who purchases a reference method or an equivalent method for purposes other than resale.

§ 53.2 General requirements for a reference method determination.

The following general requirements for a reference method determination are summarized in table A–1 of this subpart.

(a) *Manual methods.* (1) *Sulfur dioxide* (SO_2) *and lead.* For measuring SO_2 and lead, appendices A and G of part 50 of this chapter specify unique manual reference methods for measuring these pollutants. Except as provided in § 53.16, other manual methods for SO_2 and lead will not be considered for reference method determinations under this part.

(2) *PM_{10}*. A reference method for measuring PM_{10} must be a manual method that meets all requirements specified in appendix J of part 50 of this chapter and must include a PM_{10} sampler that has been shown in accordance with this part to meet all requirements specified in this subpart A and subpart D of this part.

(3) *$PM_{2.5}$*. A reference method for measuring $PM_{2.5}$ must be a manual method that meets all requirements specified in appendix L of part 50 of

this chapter and must include a $PM_{2.5}$ sampler that has been shown in accordance with this part to meet the applicable requirements specified in this subpart A and subpart E of this part. Further, reference method samplers must be manufactured in an ISO 9001-registered facility, as defined in § 53.1 and as set forth in § 53.51.

(4) *$PM_{10-2.5}$*. A reference method for measuring $PM_{10-2.5}$ must be a manual method that meets all requirements specified in appendix O of part 50 of this chapter and must include PM_{10C} and $PM_{2.5}$ samplers that have been shown in accordance with this part to meet the applicable requirements specified in this subpart A and subpart E of this part. Further, $PM_{10-2.5}$ reference method samplers must be manufactured in an ISO 9001-registered facility, as defined in § 53.1 and as set forth in § 53.51.

(b) *Automated methods.* An automated reference method for measuring CO, O_3, or NO_2 must utilize the measurement principle and calibration procedure specified in the appropriate appendix to part 50 of this chapter and must have been shown in accordance with this part to meet the requirements specified in this subpart A and subpart B of this part.

§ 53.3 General requirements for an equivalent method determination.

(a) *Manual methods.* A manual equivalent method must have been shown in accordance with this part to satisfy the applicable requirements specified in this subpart A and subpart C of this part. In addition, a PM sampler associated with a manual equivalent method for PM_{10}, $PM_{2.5}$, or $PM_{10-2.5}$ must have been shown in accordance with this part to satisfy the following additional requirements, as applicable:

(1) *PM_{10}*. A PM_{10} sampler associated with a manual method for PM_{10} must satisfy the requirements of subpart D of this part.

(2) *$PM_{2.5}$ Class I.* A $PM_{2.5}$ Class I equivalent method sampler must also satisfy all requirements of subpart E of this part, which shall include appropriate demonstration that each and every deviation or modification from the reference method sampler specifications does not significantly alter the performance of the sampler.

(3) *$PM_{2.5}$ Class II.* (i) A $PM_{2.5}$ Class II equivalent method sampler must also satisfy the applicable requirements of subparts E and F of this part or the alternative requirements in paragraph (a)(3)(ii) of this section.

(ii) In lieu of the applicable requirements specified for Class II $PM_{2.5}$ methods in subparts C and F of this part, a Class II $PM_{2.5}$ equivalent method sampler may alternatively meet the applicable requirements in paragraphs (b)(3)(i) through (iii) of this section and the testing, performance, and comparability requirements specified for Class III equivalent methods for $PM_{2.5}$ in subpart C of this part.

(4) *$PM_{10-2.5}$ Class I.* A $PM_{10-2.5}$ Class I equivalent method sampler must also satisfy the applicable requirements of subpart E of this part (there are no additional requirements specifically for Class I $PM_{10-2.5}$ methods in subpart C of this part).

(5) *$PM_{10-2.5}$ Class II.* (i) A $PM_{10-2.5}$ Class II equivalent method must also satisfy the applicable requirements of subpart C of this part and also the applicable requirements and provisions of paragraphs (b)(3)(i) through (iii) of this section, or the alternative requirements in paragraph (a)(5)(ii) of this section.

(ii) In lieu of the applicable requirements specified for Class II $PM_{10-2.5}$ methods in subpart C of this part and in paragraph (b)(3)(iii) of this section, a Class II $PM_{10-2.5}$ equivalent method sampler may alternatively meet the applicable requirements in paragraphs (b)(3)(i) and (ii) of this section and the testing, performance, and comparability requirements specified for Class III equivalent methods for $PM_{10-2.5}$ in subpart C of this part.

(6) *ISO 9001.* All designated equivalent methods for $PM_{2.5}$ or $PM_{10-2.5}$ must be manufactured in an ISO 9001-registered facility, as defined in § 53.1 and as set forth in § 53.51.

(b) *Automated methods.* All types of automated equivalent methods must have been shown in accordance with this part to satisfy the applicable requirements specified in this subpart A and subpart C of this part. In addition, an automated equivalent method must have been shown in accordance with this part to satisfy the following additional requirements, as applicable:

(1) An automated equivalent method for pollutants other than PM must be shown in accordance with this part to satisfy the applicable requirements specified in subpart B of this part.

(2) An automated equivalent method for PM_{10} must be shown in accordance with this part to satisfy the applicable requirements of subpart D of this part.

(3) A Class III automated equivalent method for $PM_{2.5}$ or $PM_{10-2.5}$ must be shown in accordance with this part to satisfy the requirements in paragraphs (b)(3)(i) through (iii) of this section, as applicable.

(i) All pertinent requirements of 40 CFR part 50, appendix L, including sampling height, range of operational conditions, ambient temperature and pressure sensors, outdoor enclosure, electrical power supply, control devices and operator interfaces, data output port, operation/instruction manual, data output and reporting requirements, and any other requirements that would be reasonably applicable to the method, unless adequate (as determined by the Administrator) rationale can be provided to support the contention that a particular requirement does not or should not be applicable to the particular candidate method.

(ii) All pertinent tests and requirements of subpart E of this part, such as instrument manufacturing quality control; final assembly and inspection; manufacturer's audit checklists; leak checks; flow rate accuracy, measurement accuracy, and flow rate cut-off; operation following power interruptions; effect of variations in power line voltage, ambient temperature and ambient pressure; and aerosol transport; unless adequate (as determined by the Administrator) rationale can be provided to support the contention that a particular test or requirement does not or should not be applicable to the particular candidate method.

(iii) Candidate methods shall be tested for and meet any performance requirements, such as inlet aspiration, particle size separation or selection characteristics, change in particle separation or selection characteristics due to loading or other operational conditions, or effects of surface exposure and particle volatility, determined by the Administrator to be necessary based on the nature, design, and specifics of the candidate method and the extent to which it deviates from the design and performance characteristics of the reference method. These performance requirements and the specific test(s) for them will be determined by Administrator for each specific candidate method or type of candidate method and may be similar to or based on corresponding tests and requirements set forth in subpart F of this part or may be special requirements and tests tailored by the Administrator to the specific nature, design, and operational characteristics of the candidate method. For example, a candidate method with an inlet design deviating substantially from the design of the reference method inlet would likely be subject to an inlet aspiration test similar to that set forth in § 53.63. Similarly, a candidate method having an inertial fractionation system substantially different from that of the reference method would likely be subject to a static fractionation test and a loading test similar to those set forth in §§ 53.64 and 53.65, respectively. A candidate method with more extensive or profound deviations from the design and function of the reference method may be subject to other tests, full wind-tunnel tests similar to those described in § 53.62, or to special tests adapted or developed individually to accommodate the specific type of measurement or operation of the candidate method.

(4) All designated equivalent methods for $PM_{2.5}$ or $PM_{10-2.5}$ must be manufactured in an ISO 9001-registered facility, as defined in § 53.1 and as set forth in § 53.51.

§ 53.4 Applications for reference or equivalent method determinations.

(a) Applications for reference or equivalent method determinations shall be submitted in duplicate to: Director, National Exposure Research Laboratory, Reference and Equivalent Method Program (MD–D205–03), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711 (Commercial delivery address: 4930 Old Page Road, Durham, North Carolina 27703).

(b) Each application shall be signed by an authorized representative of the applicant, shall be marked in accordance with § 53.15 (if applicable), and shall contain the following:

(1) A clear identification of the candidate method, which will distinguish it from all other methods such that the method may be referred to unambiguously. This identification must consist of a unique series of descriptors such as title, identification number, analyte, measurement principle, manufacturer, brand, model, etc., as necessary to distinguish the method from all other methods or method variations, both within and outside the applicant's organization.

(2) A detailed description of the candidate method, including but not limited to the following: The measurement principle, manufacturer, name, model number and other forms of identification, a list of the significant components, schematic diagrams, design drawings, and a detailed description of the apparatus and measurement procedures. Drawings and descriptions pertaining to candidate methods or samplers for $PM_{2.5}$ or $PM_{10-2.5}$ must meet all applicable requirements in reference 1 of appendix A of this subpart, using appropriate graphical, nomenclature, and mathematical conventions such as those specified in references 3 and 4 of appendix A of this subpart.

(3) A copy of a comprehensive operation or instruction manual providing a complete and detailed description of the operational, maintenance, and calibration procedures prescribed for field use of the candidate method and all instruments utilized as part of that method (under § 53.9(a)).

(i) As a minimum this manual shall include:

(A) Description of the method and associated instruments.

(B) Explanation of all indicators, information displays, and controls.

(C) Complete setup and installation instructions, including any additional materials or supplies required.

(D) Details of all initial or startup checks or acceptance tests and any auxiliary equipment required.

(E) Complete operational instructions.

(F) Calibration procedures and descriptions of required calibration equipment and standards.

(G) Instructions for verification of correct or proper operation.

(H) Trouble-shooting guidance and suggested corrective actions for abnormal operation.

(I) Required or recommended routine, periodic, and preventative maintenance and maintenance schedules.

(J) Any calculations required to derive final concentration measurements.

(K) Appropriate references to any applicable appendix of part 50 of this chapter; reference 6 of appendix A of this subpart; and any other pertinent guidelines.

(ii) The manual shall also include adequate warning of potential safety hazards that may result from normal use and/or malfunction of the method and a description of necessary safety precautions. (See § 53.9(b).) However, the previous requirement shall not be interpreted to constitute or imply any warranty of safety of the method by EPA. For samplers and automated methods, the manual shall include a clear description of all procedures pertaining to installation, operation, preventive maintenance, and troubleshooting and shall also include parts identification diagrams. The manual may be used to satisfy the requirements of paragraphs (b)(1) and (2) of this section to the extent that it includes information necessary to meet those requirements.

(4) A statement that the candidate method has been tested in accordance with the procedures described in subparts B, C, D, E, and/or F of this part, as applicable.

(5) Descriptions of test facilities and test configurations, test data, records, calculations, and test results as specified in subparts B, C, D, E, and/or F of this part, as applicable. Data must be sufficiently detailed to meet appropriate principles described in part B, sections 3.3.1 (paragraph 1) and 3.5.1 and part C, section 4.6 of reference 2 of appendix A of this subpart; and in paragraphs 1 through 3 of section 4.8 (Records) of reference 5 of appendix A of this subpart. Salient requirements from these references include the following:

(i) The applicant shall maintain and include records of all relevant measuring equipment, including the make, type, and serial number or other identification, and most recent calibration with identification of the measurement standard or standards used and their National Institute of Standards and Technology (NIST) traceability. These records shall demonstrate the measurement capability of each item of measuring equipment used for the application and include a description and justification (if needed) of the measurement setup or configuration in which it was used for the tests. The calibration results shall be recorded and identified in sufficient detail so that the traceability of all measurements can be determined and any measurement could be reproduced under conditions close to the original conditions, if necessary, to resolve any anomalies.

(ii) Test data shall be collected according to the standards of good practice and by qualified personnel. Test anomalies or irregularities shall be documented and explained or justified. The impact and significance of the deviation on test results and conclusions shall be determined. Data collected shall correspond directly to the specified test requirement and be labeled and identified clearly so that results can be verified and evaluated against the test requirement. Calculations or data manipulations must be explained in detail so that they can be verified.

(6) A statement that the method, analyzer, or sampler tested in accordance with this part is representative of the candidate method described in the application.

(c) For candidate automated methods and candidate manual methods for PM_{10}, $PM_{2.5}$, and $PM_{10-2.5}$ the application shall also contain the following:

(1) A detailed description of the quality system that will be utilized, if the candidate method is designated as a reference or equivalent method, to ensure that all analyzers or samplers offered for sale under that designation will have essentially the same

performance characteristics as the analyzer(s) or samplers tested in accordance with this part. In addition, the quality system requirements for candidate methods for $PM_{2.5}$ and $PM_{10\text{-}2.5}$ must be described in sufficient detail, based on the elements described in section 4 of reference 1 (Quality System Requirements) of appendix A of this subpart. Further clarification is provided in the following sections of reference 2 of appendix A of this subpart: part A (Management Systems), sections 2.2 (Quality System and Description), 2.3 (Personnel Qualification and Training), 2.4 (Procurement of Items and Services), 2.5 (Documents and Records), and 2.7 (Planning); part B (Collection and Evaluation of Environmental Data), sections 3.1 (Planning and Scoping), 3.2 (Design of Data Collection Operations), and 3.5 (Assessment and Verification of Data Usability); and part C (Operation of Environmental Technology), sections 4.1 (Planning), 4.2 (Design of Systems), and 4.4 (Operation of Systems).

(2) A description of the durability characteristics of such analyzers or samplers (see § 53.9(c)). For methods for $PM_{2.5}$ and $PM_{10\text{-}2.5}$ the warranty program must ensure that the required specifications (see Table A–1 to this subpart) will be met throughout the warranty period and that the applicant accepts responsibility and liability for ensuring this conformance or for resolving any nonconformities, including all necessary components of the system, regardless of the original manufacturer. The warranty program must be described in sufficient detail to meet appropriate provisions of the ANSI/ASQC and ISO 9001 standards (references 1 and 2 in appendix A of this subpart) for controlling conformance and resolving nonconformance, particularly sections 4.12, 4.13, and 4.14 of reference 1 in appendix A of this subpart.

(i) Section 4.12 in reference 1 of appendix A of this subpart requires the manufacturer to establish and maintain a system of procedures for identifying and maintaining the identification of inspection and test status throughout all phases of manufacturing to ensure that only instruments that have passed the required inspections and tests are released for sale.

(ii) Section 4.13 in reference 1 of appendix A of this subpart requires documented procedures for control of nonconforming product, including review and acceptable alternatives for disposition; section 4.14 in reference 1 of appendix A of this subpart requires documented procedures for implementing corrective (4.14.2) and preventive (4.14.3) action to eliminate the causes of actual or potential nonconformities. In particular, section 4.14.3 requires that potential causes of nonconformities be eliminated by using information such as service reports and customer complaints to eliminate potential causes of nonconformities.

(d) For candidate reference or equivalent methods for $PM_{2.5}$ and Class II or Class III equivalent methods for $PM_{10\text{-}2.5}$, the applicant, if requested by EPA, shall provide to EPA for test purposes one sampler or analyzer that is representative of the sampler or analyzer associated with the candidate method. The sampler or analyzer shall be shipped FOB destination to Director, National Exposure Research Laboratory, Reference and Equivalent Method Program (MD–D205–03), U.S. Environmental Protection Agency, 4930 Old Page Road, Durham, North Carolina 27703, scheduled to arrive concurrent with or within 30 days of the arrival of the other application materials. This analyzer or sampler may be subjected to various tests that EPA determines to be necessary or appropriate under § 53.5(f), and such tests may include special tests not described in this part. If the instrument submitted under this paragraph malfunctions, becomes inoperative, or fails to perform as represented in the application before the necessary EPA testing is completed, the applicant shall be afforded an opportunity to repair or replace the device at no cost to EPA. Upon completion of EPA testing, the analyzer or sampler submitted under this paragraph shall be repacked by EPA for return shipment to the applicant, using the same packing materials used for shipping the instrument to EPA unless alternative packing is provided by the applicant. Arrangements for, and the cost of, return shipment shall be the responsibility of the applicant. EPA does not warrant or assume any liability for the condition of the analyzer or sampler upon return to the applicant.

§ 53.5 Processing of applications.

After receiving an application for a reference or equivalent method determination, the Administrator will, within 120 calendar days after receipt of the application, take one or more of the following actions:

(a) Send notice to the applicant, in accordance with § 53.8, that the candidate method has been determined to be a reference or equivalent method.

(b) Send notice to the applicant that the application has been rejected, including a statement of reasons for rejection.

(c) Send notice to the applicant that additional information must be submitted before a determination can be made and specify the additional information that is needed (in such cases, the 120-day period shall commence upon receipt of the additional information).

(d) Send notice to the applicant that additional test data must be submitted and specify what tests are necessary and how the tests shall be interpreted (in such cases, the 120-day period shall commence upon receipt of the additional test data).

(e) Send notice to the applicant that the application has been found to be substantially deficient or incomplete and cannot be processed until additional information is submitted to complete the application and specify the general areas of substantial deficiency.

(f) Send notice to the applicant that additional tests will be conducted by the Administrator, specifying the nature of and reasons for the additional tests and the estimated time required (in such cases, the 120-day period shall commence 1 calendar day after the additional tests have been completed).

2a. Revise §§ 53.8 and 53.9 to read as follows:

§ 53.8 Designation of reference and equivalent methods.

(a) A candidate method determined by the Administrator to satisfy the applicable requirements of this part shall be designated as a reference method or equivalent method (as applicable) by and upon publication of a notice of the designation in the **Federal Register**.

(b) Upon designation, a notice indicating that the method has been designated as a reference method or an equivalent method shall be sent to the applicant.

(c) The Administrator will maintain a current list of methods designated as reference or equivalent methods in accordance with this part and will send a copy of the list to any person or group upon request. A copy of the list will be available for inspection or copying at EPA Regional Offices and may be available via the Internet or other sources.

§ 53.9 Conditions of designation.

Designation of a candidate method as a reference method or equivalent method shall be conditioned to the applicant's compliance with the following requirements. Failure to comply with any of the requirements shall constitute a ground for cancellation of the designation in accordance with § 53.11.

(a) Any method offered for sale as a reference or equivalent method shall be accompanied by a copy of the manual referred to in § 53.4(b)(3) when delivered to any ultimate purchaser, and an electronic copy of the manual suitable for incorporating into user specific standard operating procedure documents shall be readily available to any users.

(b) Any method offered for sale as a reference or equivalent method shall generate no unreasonable hazard to operators or to the environment during normal use or when malfunctioning.

(c) Any analyzer, PM_{10} sampler, $PM_{2.5}$ sampler, or $PM_{10\text{-}2.5}$ sampler offered for sale as part of a reference or equivalent method shall function within the limits of the performance specifications referred to in § 53.20(a), § 53.30(a), § 53.50, or § 53.60, as applicable, for at least 1 year after delivery and acceptance when maintained and operated in accordance with the manual referred to in § 53.4(b)(3).

(d) Any analyzer, PM_{10} sampler, $PM_{2.5}$ sampler, or $PM_{10\text{-}2.5}$ sampler offered for sale as a reference or equivalent method shall bear a prominent, permanently affixed label or sticker indicating that the analyzer or sampler has been designated by EPA as a reference method or as an equivalent method (as applicable) in accordance with this part and displaying any designated method identification number that may be assigned by EPA.

(e) If an analyzer is offered for sale as a reference or equivalent method and has one or more selectable ranges, the label or sticker required by paragraph (d) of this section shall be placed in close proximity to the range selector and shall indicate clearly which range or ranges have been designated as parts of the reference or equivalent method.

(f) An applicant who offers analyzers, PM_{10} samplers, $PM_{2.5}$ samplers, or $PM_{10\text{-}2.5}$ samplers for sale as reference or equivalent methods shall maintain an accurate and current list of the names and mailing addresses of all ultimate purchasers of such analyzers or samplers. For a period of 7 years after publication of the reference or equivalent method designation applicable to such an analyzer or sampler, the applicant shall notify all ultimate purchasers of the analyzer or sampler within 30 days if the designation has been canceled in accordance with § 53.11 or § 53.16 or if adjustment of the analyzer or sampler is necessary under § 53.11(b).

(g) If an applicant modifies an analyzer, PM_{10} sampler, $PM_{2.5}$ sampler, or $PM_{10\text{-}2.5}$ sampler that has been designated as a reference or equivalent method, the applicant shall not sell the modified analyzer or sampler as a reference or equivalent method nor attach a label or sticker to the modified analyzer or sampler under paragraph (d) or (e) of this section until the applicant has received notice under § 53.14(c) that the existing designation or a new designation will apply to the modified analyzer or sampler or has applied for and received notice under § 53.8(b) of a new reference or equivalent method determination for the modified analyzer or sampler.

(h) An applicant who has offered $PM_{2.5}$ or $PM_{10\text{-}2.5}$ samplers or analyzers for sale as part of a reference or equivalent method may continue to do so only so long as the facility in which the samplers or analyzers are manufactured continues to be an ISO 9001-registered facility, as set forth in subpart E of this part. In the event that the ISO 9001 registration for the facility is withdrawn, suspended, or otherwise becomes inapplicable, either permanently or for some specified time interval, such that the facility is no longer an ISO 9001-registered facility, the applicant shall notify EPA within 30 days of the date the facility becomes other than an ISO 9001-registered facility, and upon such notification, EPA shall issue a preliminary finding and notification of possible cancellation of the reference or equivalent method designation under § 53.11.

(i) An applicant who has offered $PM_{2.5}$ or $PM_{10\text{-}2.5}$ samplers or analyzers for sale as part of a reference or equivalent method may continue to do so only so long as updates of the Product Manufacturing Checklist set forth in subpart E of this part are submitted annually. In the event that an annual Checklist update is not received by EPA within 12 months of the date of the last such submitted Checklist or Checklist update, EPA shall notify the applicant within 30 days that the Checklist update has not been received and shall, within 30 days from the issuance of such notification, issue a preliminary finding and notification of possible cancellation of the reference or equivalent method designation under § 53.11.

Table A–1 to subpart A of part 53 is revised to read as follows:

TABLE A–1 TO SUBPART A OF PART 53.—SUMMARY OF APPLICABLE REQUIREMENTS FOR REFERENCE AND EQUIVALENT METHODS FOR AIR MONITORING OF CRITERIA POLLUTANTS

Pollutant	Ref. or equivalent	Manual or automated	Applicable part 50 appendix	Applicable subparts of part 53					
				A	B	C	D	E	F
SO^2	Reference	Manual	A						
	Equivalent	Manual		✔		✔			
		Automated		✔	✔	✔			
CO	Reference	Automated	C	✔	✔				
	Equivalent	Manual		✔		✔			
		Automated		✔	✔	✔			
O_3	Reference	Automated	D	✔	✔				
	Equivalent	Manual		✔		✔			
		Automated		✔	✔	✔			
NO_2	Reference	Automated	F	✔	✔				
	Equivalent	Manual		✔		✔			
		Automated		✔	✔	✔			
Pb	Reference	Manual	G						
	Equivalent	Manual		✔		✔			
PM_{10}	Reference	Manual	J	✔			✔		
	Equivalent	Manual		✔		✔	✔		
		Automated		✔		✔	✔		
$PM_{2.5}$	Reference	Manual	L	✔				✔	
	Equivalent Class I	Manual	L	✔		✔		✔	
	Equivalent Class II	Manual	L[1]	✔		[2]✔		✔	[1,2]✔

TABLE A–1 TO SUBPART A OF PART 53.—SUMMARY OF APPLICABLE REQUIREMENTS FOR REFERENCE AND EQUIVALENT METHODS FOR AIR MONITORING OF CRITERIA POLLUTANTS—Continued

Pollutant	Ref. or equivalent	Manual or automated	Applicable part 50 appendix	Applicable subparts of part 53					
				A	B	C	D	E	F
	Equivalent Class III	Automated	L[1]	✔		✔		[1]✔	[1]✔
$PM_{10-2.5}$	Reference	Manual	O[2]	✔				✔	
	Equivalent								
	Equivalent Class II	Manual	O[2]	✔		[2]✔		[1]✔	[1,2]✔
	Equivalent Class III	Automated	L[1], O[1,2]	✔		✔		[1]✔	[1]✔

[1] Some requirements may apply, based on the nature of each particular candidate method, as determined by the Administrator.
[2] Alternative Class III requirements may be substituted.

4. Paragraph (6) of appendix A to subpart A of part 53 is revised to read as follows:

Appendix A to Subpart A of Part 53—References

* * * * *

(6) Quality Assurance Guidance Document 2.12. Monitoring $PM_{2.5}$ in Ambient Air Using Designated Reference or Class I Equivalent Methods. U.S. EPA, National Exposure Research Laboratory, Research Triangle Park, NC, November 1998 or later edition. Currently available at *http://www.epa.gov/ttn/amtic/pmqainf.html.*

Subpart C—[Amended]

5. Section 53.30 is revised to read as follows:

§ 53.30 General provisions.

(a) *Determination of comparability.* The test procedures prescribed in this subpart shall be used to determine if a candidate method is comparable to a reference method when both methods measure pollutant concentrations in ambient air. Minor deviations in testing requirements and acceptance requirements set forth in this subpart, in connection with any documented extenuating circumstances, may be determined by the Administrator to be acceptable, at the discretion of the Administrator.

(b) *Selection of test sites.* (1) Each test site shall be in an area which can be shown to have at least moderate concentrations of various pollutants. Each site shall be clearly identified and shall be justified as an appropriate test site with suitable supporting evidence such as a description of the surrounding area, characterization of the sources and pollutants typical in the area, maps, population density data, vehicular traffic data, emission inventories, pollutant measurements from previous years, concurrent pollutant measurements, meteorological data, and other information useful in supporting the suitability of the site for the comparison test or tests.

(2) If approval of one or more proposed test sites is desired prior to conducting the tests, a written request for approval of the test site or sites must be submitted to the address given in § 53.4. The request should include information identifying the type of candidate method and one or more specific proposed test sites along with a justification for each proposed specific site as described in paragraph (b)(1) of this section. The EPA will evaluate each proposed site and approve the site, disapprove the site, or request more information about the site. Any such pre-test approval of a test site by the EPA shall indicate only that the site meets the applicable test site requirements for the candidate method type; it shall not indicate, suggest, or imply that test data obtained at the site will necessarily meet any of the applicable data acceptance requirements. The Administrator may exercise discretion in selecting a different site (or sites) for any additional tests the Administrator decides to conduct.

(c) *Test atmosphere.* Ambient air sampled at an appropriate test site or sites shall be used for these tests. Simultaneous concentration measurements shall be made in each of the concentration ranges specified in tables C–1, C–3, or C–4 of this subpart, as appropriate.

(d) *Sampling or sample collection.* All test concentration measurements or samples shall be taken in such a way that both the candidate method and the reference method obtain air samples that are alike or as nearly identical as practical.

(e) *Operation.* Set-up and start-up of the test analyzer(s), test sampler(s), and reference method analyzers or samplers shall be in strict accordance with the applicable operation manual(s).

(f) *Calibration.* The reference method shall be calibrated according to the appropriate appendix to part 50 of this chapter (if it is a manual method) or according to the applicable operation manual(s) (if it is an automated method). A candidate method (or portion thereof) shall be calibrated according to the applicable operation manual(s), if such calibration is a part of the method.

(g) *Submission of test data and other information.* All recorder charts, calibration data, records, test results, procedural descriptions and details, and other documentation obtained from (or pertinent to) these tests shall be identified, dated, signed by the analyst performing the test, and submitted. For candidate methods for $PM_{2.5}$ and $PM_{10-2.5}$, all submitted information must meet the requirements of the ANSI/ASQC E4 Standard, sections 3.3.1, paragraphs 1 and 2 (reference 1 of appendix A of this subpart).

§ 53.31 [Removed]

6. Section 53.31 is removed and reserved.

7. Section 53.32 is revised to read as follows:

§ 53.32 Test procedures for methods for SO_2, CO, O_3, and NO_2.

(a) *Comparability.* Comparability is shown for SO_2, CO, O_3, and NO_2 methods when the differences between:

(1) Measurements made by a candidate manual method or by a test analyzer representative of a candidate automated method, and;

(2) Measurements made simultaneously by a reference method are less than or equal to the values for maximum discrepancy specified in table C–1 of this subpart.

(b) *Test measurements.* All test measurements are to be made at the same test site. If necessary, the concentration of pollutant in the sampled ambient air may be augmented with artificially generated pollutant to facilitate measurements in the specified ranges, as described under paragraph (f)(4) of this section.

(c) *Requirements for measurements or samples.* All test measurements made or test samples collected by means of a sample manifold as specified in paragraph (f)(4) of this section shall be at a room temperature between 20° and 30°C, and at a line voltage between 105 and 125 volts. All methods shall be calibrated as specified in § 53.30(f) prior to initiation of the tests.

(d) *Set-up and start-up.* (1) Set-up and start-up of the test analyzer, test sampler(s), and reference method shall be in strict accordance with the applicable operation manual(s). If the test analyzer does not have an integral strip chart or digital data recorder, connect the analyzer output to a suitable strip chart or digital data recorder. This recorder shall have a chart width of at least 25 centimeters, a response time of 1 second or less, a deadband of not more than 0.25 percent of full scale, and capability of either reading measurements at least 5 percent below zero or offsetting the zero by at least 5 percent. Digital data shall be recorded at appropriate time intervals such that trend plots similar to a strip chart recording may be constructed with a similar or suitable level of detail.

(2) Other data acquisition components may be used along with the chart recorder during the conduct of these tests. Use of the chart recorder is intended only to facilitate visual evaluation of data submitted.

(3) Allow adequate warmup or stabilization time as indicated in the applicable operation manual(s) before beginning the tests.

(e) *Range.* (1) Except as provided in paragraph (e)(2) of this section, each method shall be operated in the range specified for the reference method in the appropriate appendix to part 50 of this chapter (for manual reference methods), or specified in table B–1 of subpart B of this part (for automated reference methods).

(2) For a candidate method having more than one selectable range, one range must be that specified in table B–1 of subpart B of this part, and a test analyzer representative of the method must pass the tests required by this subpart while operated on that range. The tests may be repeated for a broader range (*i.e.,* one extending to higher concentrations) than the one specified in table B–1 of subpart B of this part, provided that the range does not extend to concentrations more than two times the upper range limit specified in table B–1 of subpart B of this part and that the test analyzer has passed the tests required by subpart B of this part (if applicable) for the broader range. If the tests required by this subpart are conducted or passed only for the range specified in table B–1 of subpart B of this part, any equivalent method determination with respect to the method will be limited to that range. If the tests are passed for both the specified range and a broader range (or ranges), any such determination will include the broader range(s) as well as the specified range. Appropriate test data shall be submitted for each range sought to be included in such a determination.

(f) *Operation of automated methods.* (1) Once the test analyzer has been set up and calibrated and tests started, manual adjustment or normal periodic maintenance, as specified in the manual referred to in § 53.4(b)(3), is permitted only every 3 days. Automatic adjustments which the test analyzer performs by itself are permitted at any time. The submitted records shall show clearly when manual adjustments were made and describe the operations performed.

(2) All test measurements shall be made with the same test analyzer; use of multiple test analyzers is not permitted. The test analyzer shall be operated continuously during the entire series of test measurements.

(3) If a test analyzer should malfunction during any of these tests, the entire set of measurements shall be repeated, and a detailed explanation of the malfunction, remedial action taken, and whether recalibration was necessary (along with all pertinent records and charts) shall be submitted.

(4) Ambient air shall be sampled from a common intake and distribution manifold designed to deliver homogenous air samples to both methods. Precautions shall be taken in the design and construction of this manifold to minimize the removal of particulate matter and trace gases, and to insure that identical samples reach the two methods. If necessary, the concentration of pollutant in the sampled ambient air may be augmented with artificially generated pollutant. However, at all times the air sample measured by the candidate and reference methods under test shall consist of not less than 80 percent ambient air by volume. Schematic drawings, physical illustrations, descriptions, and complete details of the manifold system and the augmentation system (if used) shall be submitted.

(g) *Tests.* (1) Conduct the first set of simultaneous measurements with the candidate and reference methods:

(i) Table C–1 of this subpart specifies the type (1- or 24-hour) and number of measurements to be made in each of the three test concentration ranges.

(ii) The pollutant concentration must fall within the specified range as measured by the reference method.

(iii) The measurements shall be made in the sequence specified in table C–2 of this subpart, except for the 1-hour SO_2 measurements, which are all in the high range.

(2) For each pair of measurements, determine the difference (discrepancy) between the candidate method measurement and reference method measurement. A discrepancy which exceeds the discrepancy specified in table C–1 of this subpart constitutes a failure. Figure C–1 of this subpart contains a suggested format for reporting the test results.

(3) The results of the first set of measurements shall be interpreted as follows:

(i) Zero failures: The candidate method passes the test for comparability.

(ii) Three or more failures: The candidate method fails the test for comparability.

(iii) One or two failures: Conduct a second set of simultaneous measurements as specified in table C–1 of this subpart. The results of the combined total of first-set and second-set measurements shall be interpreted as follows:

(A) One or two failures: The candidate method passes the test for comparability.

(B) Three or more failures: The candidate method fails the test for comparability.

(iv) For SO_2, the 1-hour and 24-hour measurements shall be interpreted separately, and the candidate method must pass the tests for both 1- and 24-hour measurements to pass the test for comparability.

(4) A 1-hour measurement consists of the integral of the instantaneous concentration over a 60-minute continuous period divided by the time period. Integration of the instantaneous concentration may be performed by any appropriate means such as chemical, electronic, mechanical, visual judgment, or by calculating the mean of not less than 12 equally-spaced instantaneous readings. Appropriate allowances or corrections shall be made in cases where significant errors could occur due to characteristic lag time or rise/fall time differences between the candidate and reference methods. Details of the means of integration and any corrections shall be submitted.

(5) A 24-hour measurement consists of the integral of the instantaneous concentration over a 24-hour continuous period divided by the time period. This integration may be performed by any appropriate means such as chemical, electronic, mechanical, or by calculating the mean

of twenty-four (24) sequential 1-hour measurements.

(6) For O_3 and CO, no more than six 1-hour measurements shall be made per day. For SO_2, no more than four 1-hour measurements or one 24-hour measurement shall be made per day. One-hour measurements may be made concurrently with 24-hour measurements if appropriate.

(7) For applicable methods, control or calibration checks may be performed once per day without adjusting the test analyzer or method. These checks may be used as a basis for a linear interpolation-type correction to be applied to the measurements to correct for drift. If such a correction is used, it shall be applied to all measurements made with the method, and the correction procedure shall become a part of the method.

8. Section 53.33 is revised to read as follows:

§ 53.33 Test procedure for methods for Pb.

(a) *Comparability.* Comparability is shown for Pb methods when the differences between:

(1) Measurements made by a candidate method, and

(2) Measurements made by the reference method on simultaneously collected Pb samples (or the same sample, if applicable), are less than or equal to the value specified in table C–3 of this subpart.

(b) *Test measurements.* Test measurements may be made at any number of test sites. Augmentation of pollutant concentrations is not permitted, hence an appropriate test site or sites must be selected to provide Pb concentrations in the specified range.

(c) *Collocated samplers.* The ambient air intake points of all the candidate and reference method collocated samplers shall be positioned at the same height above the ground level, and between 2 meters (1 meter for samplers with flow rates less than 200 liters per minute (L/min)) and 4 meters apart. The samplers shall be oriented in a manner that will minimize spatial and wind directional effects on sample collection.

(d) *Sample collection.* Collect simultaneous 24-hour samples (filters) of Pb at the test site or sites with both the reference and candidate methods until at least 10 filter pairs have been obtained. A candidate method which employs a sampler and sample collection procedure that are identical to the sampler and sample collection procedure specified in the reference method, but uses a different analytical procedure, may be tested by analyzing common samples. The common samples shall be collected according to the sample collection procedure specified by the reference method and each shall be divided for respective analysis in accordance with the analytical procedures of the candidate method and the reference method.

(e) *Audit samples.* Three audit samples must be obtained from the address given in § 53.4(a). The audit samples are 3/4 × 8-inch glass fiber strips containing known amounts of Pb at the following nominal levels: 100 micrograms per strip (µg/strip); 300 µg/strip; 750 µg/strip. The true amount of Pb, in total µg/strip, will be provided with each audit sample.

(f) *Filter analysis.* (1) For both the reference method samples and the audit samples, analyze each filter extract three times in accordance with the reference method analytical procedure. The analysis of replicates should not be performed sequentially, i.e., a single sample should not be analyzed three times in sequence. Calculate the indicated Pb concentrations for the reference method samples in micrograms per cubic meter (µg/m³) for each analysis of each filter. Calculate the indicated total Pb amount for the audit samples in µg/strip for each analysis of each strip. Label these test results as R_{1A}, R_{1B}, R_{1C}, R_{2A}, R_{2B}, * * *, Q_{1A}, Q_{1B}, Q_{1C}, * * * ., where R denotes results from the reference method samples; Q denotes results from the audit samples; 1, 2, 3 indicate the filter number, and A, B, C indicate the first, second, and third analysis of each filter, respectively.

(2) For the candidate method samples, analyze each sample filter or filter extract three times and calculate, in accordance with the candidate method, the indicated Pb concentration in µg/m³ for each analysis of each filter. Label these test results as C_{1A}, C_{1B}, C_{2C}, . . ., where C denotes results from the candidate method. For candidate methods which provide a direct measurement of Pb concentrations without a separable procedure, $C_{1A}=C_{1B}=C_{1C}$, $C_{2A}=C_{2B}=C_{2C}$, etc.

(g) *Average Pb concentration.* For the reference method, calculate the average Pb concentration for each filter by averaging the concentrations calculated from the three analyses using equation 1 of this section:

Equation 1

$$R_{i\,ave} = \frac{R_{iA} + R_{iB} + R_{iC}}{3}$$

where, i is the filter number.

(h) *Accuracy.* (1)(i) For the audit samples, calculate the average Pb concentration for each strip by averaging the concentrations calculated from the three analyses using equation 2 of this section:

Equation 2

$$Q_{i\,ave} = \frac{Q_{iA} + Q_{iB} + Q_{iC}}{3}$$

where, i is audit sample number.

(ii) Calculate the percent difference (D_q) between the indicated Pb concentration for each audit sample and the true Pb concentration (T_q) using equation 3 of this section:

Equation 3

$$D_{qi} = \frac{Q_{i\,ave} - T_{qi}}{T_{qi}} \times 100\%$$

(2) If any difference value (D_{qi}) exceeds ±5 percent, the accuracy of the reference method analytical procedure is out-of-control. Corrective action must be taken to determine the source of the error(s) (e.g., calibration standard discrepancies, extraction problems, etc.) and the reference method and audit sample determinations must be repeated according to paragraph (f) of this section, or the entire test procedure (starting with paragraph (d) of this section) must be repeated.

(i) *Acceptable filter pairs.* Disregard all filter pairs for which the Pb concentration, as determined in paragraph (g) of this section by the average of the three reference method determinations, falls outside the range of 0.5 to 4.0 µg/m³. All remaining filter pairs must be subjected to the tests for precision and comparability in paragraphs (j) and (k) of this section. At least five filter pairs must be within the 0.5 to 4.0 µg/m³ range for the tests to be valid.

(j) *Test for precision.* (1) Calculate the precision (P) of the analysis (in percent) for each filter and for each method, as the maximum minus the minimum divided by the average of the three concentration values, using equation 4 or equation 5 of this section:

Equation 4

$$P_{Ri} = \frac{R_{i\,max} - R_{i\,min}}{R_{i\,ave}} \times 100\%$$

or

Equation 5

$$P_{Ci} = \frac{C_{i\,max} - C_{i\,min}}{C_{i\,ave}} \times 100\%$$

where, i indicates the filter number.

(2) If any reference method precision value (P_{Ri}) exceeds 15 percent, the precision of the reference method analytical procedure is out-of-control. Corrective action must be taken to determine the source(s) of imprecision, and the reference method determinations must be repeated according to paragraph (f) of this section, or the entire test procedure (starting with paragraph (d) of this section) must be repeated.

(3) If any candidate method precision value (P_{Ci}) exceeds 15 percent, the candidate method fails the precision test.

(4) The candidate method passes this test if all precision values (*i.e.*, all P_{Ri}'s and all P_{Ci}'s) are less than 15 percent.

(k) *Test for comparability.* (1) For each filter or analytical sample pair, calculate all nine possible percent differences (D) between the reference and candidate methods, using all nine possible combinations of the three determinations (A, B, and C) for each method using equation 6 of this section:

Equation 6

$$D_{in} = \frac{C_{ij} - R_{ik}}{R_{ik}} \times 100\%$$

where, i is the filter number, and n numbers from 1 to 9 for the nine possible difference combinations for the three determinations for each method (j = A, B, C, candidate; k = A, B, C, reference).

(2) If none of the percent differences (D) exceeds ±20 percent, the candidate method passes the test for comparability.

(3) If one or more of the percent differences (D) exceed ±20 percent, the candidate method fails the test for comparability.

(4) The candidate method must pass both the precision test (paragraph (j) of this section) and the comparability test (paragraph (k) of this section) to qualify for designation as an equivalent method.

9. Section 53.34 is revised to read as follows:

§ 53.34 Test procedure for methods for PM_{10} and Class I methods for $PM_{2.5}$.

(a) *Comparability.* Comparability is shown for PM_{10} methods and for Class I methods for $PM_{2.5}$ when the relationship between:

(1) Measurements made by a candidate method, and

(2) Measurements made by a corresponding reference method on simultaneously collected samples (or the same sample, if applicable) at each of one or more test sites (as required) is such that the linear regression parameters (slope, intercept, and correlation coefficient) describing the relationship meet the requirements specified in table C–4 of this subpart.

(b) *Methods for PM_{10}.* Test measurements must be made, or derived from particulate samples collected, at not less than two test sites, each of which must be located in a geographical area characterized by ambient particulate matter that is significantly different in nature and composition from that at the other test site(s). Augmentation of pollutant concentrations is not permitted, hence appropriate test sites must be selected to provide the minimum number of test PM_{10} concentrations in the ranges specified in table C–4 of this subpart. The tests at the two sites may be conducted in different calendar seasons, if appropriate, to provide PM_{10} concentrations in the specified ranges.

(c) *PM_{10} methods employing the same sampling procedure as the reference method but a different analytical method.* Candidate methods for PM_{10} which employ a sampler and sample collection procedure that are identical to the sampler and sample collection procedure specified in the reference method, but use a different analytical procedure, may be tested by analyzing common samples. The common samples shall be collected according to the sample collection procedure specified by the reference method and shall be analyzed in accordance with the analytical procedures of both the candidate method and the reference method.

(d) *Methods for $PM_{2.5}$.* Augmentation of pollutant concentrations is not permitted, hence appropriate test sites must be selected to provide the minimum number of test measurement sets to meet the requirements for $PM_{2.5}$ concentrations in the ranges specified in table C–4 of this subpart. Only one test site is required, and the site need only meet the $PM_{2.5}$ ambient concentration levels required by table C–4 of this subpart. A total of 10 valid measurement sets is required.

(e) *Collocated measurements.* (1) Set up three reference method samplers collocated with three candidate method samplers or analyzers at each of the number of test sites specified in table C–4 of this subpart.

(2) The ambient air intake points of all the candidate and reference method collocated samplers or analyzers shall be positioned at the same height above the ground level, and between 2 meters (1 meter for samplers or analyzers with flow rates less than 200 L/min) and 4 meters apart. The samplers shall be oriented in a manner that will minimize spatial and wind directional effects on sample collection.

(3) At each site, obtain as many sets of simultaneous PM_{10} or $PM_{2.5}$ measurements as necessary (see table C–4 of this subpart), each set consisting of three reference method and three candidate method measurements, all obtained simultaneously.

(4) Candidate PM_{10} method measurements shall be nominal 24-hour (±1 hour) integrated measurements or shall be averaged to obtain the mean concentration for a nominal 24-hour period. $PM_{2.5}$ measurements may be either nominal 24- or 48-hour integrated measurements. All collocated measurements in a measurement set must cover the same nominal 24- or 48-hour time period.

(5) For samplers, retrieve the samples promptly after sample collection and analyze each sample according to the reference method or candidate method, as appropriate, and determine the PM_{10} or $PM_{2.5}$ concentration in µg/m3. If the conditions of paragraph (c) of this section apply, collect sample sets only with the three reference method samplers. Guidance for quality assurance procedures for $PM_{2.5}$ methods is found in ''Quality Assurance Document 2.12'' (reference (2) in appendix A to this subpart).

(f) *Sequential samplers.* For sequential samplers, the sampler shall be configured for the maximum number of sequential samples and shall be set for automatic collection of all samples sequentially such that the test samples are collected equally, to the extent possible, among all available sequential channels or utilizing the full available sequential capability.

(g) *Calculation of reference method averages and precisions.* (1) For each of the measurement sets, calculate the average PM_{10} or $PM_{2.5}$ concentration obtained with the reference method samplers, using equation 7 of this section:

Equation 7

$$\overline{R}_j = \frac{\sum_{i=1}^{3} R_{i,j}}{3}$$

Where:

R = The concentration measurements from the reference methods;

i = The sampler number; and

j = The measurement set number.

(2) For each of the measurement sets, calculate the precision of the reference method PM_{10} or $PM_{2.5}$ measurements as the standard deviation, PR_j, using equation 8 of this section:

Equation 8

$$P_{Rj} = \sqrt{\frac{\sum_{i=1}^{3} R_{i,j}^{2} - \frac{1}{3}\left(\sum_{i=1}^{3} R_{i,j}\right)^{2}}{2}}$$

(3) For each measurement set, also calculate the precision of the reference method PM_{10} or $PM_{2.5}$ measurements as the relative standard deviation, RP_{Rj}, in percent, using equation 9 of this section:

Equation 9

$$RP_{Rj} = \frac{P_{Rj}}{\bar{R}_j} \times 100\%$$

(h) *Acceptability of measurement sets.* Each measurement set is acceptable and valid only if the three reference method measurements and the three candidate method measurements are obtained and are valid, $\bar{R}_j$ falls within the acceptable concentration range specified in table C–4 of this subpart, and either PR_j or RP_{Rj} is within the corresponding limit for reference method precision specified in table C–4 of this subpart. For each site, table C–4 of this subpart specifies the minimum number of measurement sets required having $\bar{R}_j$ above and below specified concentrations for 24- or 48-hour samples. Additional measurement sets shall be obtained, as necessary, to provide the minimum number of acceptable measurement sets for each category and the minimum total number of acceptable measurement sets for each test site. If more than the minimum number of measurement sets are collected that meet the acceptability criteria, all such measurement sets shall be used to demonstrate comparability.

(i) *Candidate method average concentration measurement.* For each of the acceptable measurement sets, calculate the average PM_{10} or $PM_{2.5}$ concentration measurements obtained with the candidate method samplers, using equation 10 of this section:

Equation 10

$$\bar{C}_j = \frac{\sum_{i=1}^{3} C_{i,j}}{3}$$

Where:

C = The concentration measurements from the candidate methods;

i = The measurement number in the set; and

j = The measurement set number.

(j) *Test for comparability.* (1) For each site, plot all of the average PM_{10} or $PM_{2.5}$ measurements obtained with the candidate method ($\bar{C}_j$) against the corresponding average PM_{10} or $PM_{2.5}$ measurements obtained with the reference method ($\bar{R}_j$). For each site, calculate and record the linear regression slope and intercept, and the correlation coefficient.

(2) To pass the test for comparability, the slope, intercept, and correlation coefficient calculated under paragraph (j)(1) of this section must be within the limits specified in table C–4 of this subpart for all test sites.

10. Section 53.35 is added to read as follows:

§ 53.35 Test procedure for Class II and Class III methods for $PM_{2.5}$ and $PM_{10-2.5}$.

(a) *Overview.* Class II and Class III candidate equivalent methods shall be tested for comparability of $PM_{2.5}$ or $PM_{10-2.5}$ measurements to corresponding collocated $PM_{2.5}$ or $PM_{10-2.5}$ reference method measurements at each of multiple field sites, as required. Comparability is shown for the candidate method when simultaneous collocated measurements made by candidate and reference methods meet the comparability requirements specified in this section § 53.35 and in table C–4 of this subpart at each of the required test sites.

(b) *Test sites and seasons.* (1) *Test sites.* Comparability testing is required at each of the applicable test sites required by this paragraph (b). Each test site must also meet the general test site requirements specified in § 53.30(b).

(i) *$PM_{2.5}$ Class II and Class III candidate methods.* Test sites should be chosen to provide representative chemical and meteorological characteristics with respect to nitrates, sulfates, organic compounds, and various levels of humidity, wind, and elevation. For Class III methods, one test site shall be selected in each of the following general locations. For Class II methods, two test sites, one eastern site and one western site, shall be selected from these locations. Test site A shall be in the Los Angeles basin area in a location that is characterized by relatively high $PM_{2.5}$, nitrates, and semi-volatile organic pollutants. Test site B shall be in a northeastern or mid-Atlantic U.S. city that is seasonally characterized by high sulfate concentrations, high relative humidity, and wintertime conditions. Test site C shall be in a western U.S. city such as Denver, Salt Lake City, or Albuquerque in a location that is in an area characterized by cold weather, higher elevation, winds, and dust.

(ii) *$PM_{10-2.5}$ Class II and Class III candidate methods.* Test sites shall be chosen to provide modest to high levels of $PM_{10-2.5}$ representative of locations in proximity to urban sources of $PM_{10-2.5}$ such as high-density traffic on paved roads, industrial sources, and construction activities. For Class III methods, one test site shall be selected in each of the following general locations. At least one of the test sites shall have characteristic wintertime temperatures of 0°C or lower. For Class II methods, two test sites, one eastern site and one western site, shall be selected from these locations. Test site A shall be in the Los Angeles basin or the California Central Valley area. Test site B shall be in a large U.S. city east of the Mississippi River, having characteristically high humidity levels. Test site C shall be in a western U.S. city characterized by a high ratio of $PM_{10-2.5}$ to $PM_{2.5}$, with exposure to rural windblown dust, such as Las Vegas or Phoenix.

(2) *Test seasons.* (i) For $PM_{2.5}$ and $PM_{10-2.5}$ Class III candidate methods, test campaigns are required in both summer and winter seasons at test sites A and B. A test campaign is required only in the winter season at test site C. (A total of 5 test campaigns is required.) The summer season shall be defined as the typically warmest 3 or 4 months of the year at the site; the winter season shall be defined as the typically coolest 3 or 4 months of the year at the site.

(ii) For Class II $PM_{2.5}$ and $PM_{10-2.5}$ candidate methods, only one test campaign is required at each site, at any time of year (total of 2 test campaigns).

(3) *Test concentrations.* The test sites should be selected to provide ambient concentrations within the concentration limits specified in table C–4 of this subpart, and also to provide a wide range of test concentrations. A narrow range of test concentrations may result in a low concentration coefficient of variation statistic for the test measurements, making the test for correlation coefficient more difficult to pass (see paragraph (h) of this section, test for comparison correlation).

(4) *Pre-approval of test sites.* The EPA recommends that the applicant seek EPA approval of each proposed test site prior to conducting test measurements at the site. To do so, the applicant should submit a request for approval as described in § 53.30(b)(2).

(c) *Collocated measurements.* (1) For each test campaign, three reference method samplers and three candidate method samplers or analyzers shall be installed and operated concurrently at each test site within each required season (if applicable), as specified in paragraph (b) of this section. All reference method samplers shall be of single-filter design (not multi-filter, sequential sample design). Each candidate method shall be setup and operated in accordance with its associated manual referred to in § 53.4(b)(3) and in accordance with applicable guidance in ''Quality Assurance Document 2.12'' (reference (2) in appendix A to this subpart). All samplers or analyzers shall be placed so that they sample or measure air representative of the surrounding area (within one kilometer) and are not unduly affected by adjacent buildings, air handling equipment, industrial operations, traffic, or other local influences. The ambient air inlet points of all samplers and analyzers shall be positioned at the same height above the ground level and between 2 meters (1 meter for instruments having sample inlet flow rates less than 200 L/min) and 4 meters apart.

(2) A minimum of 23 valid and acceptable measurement sets of $PM_{2.5}$ or $PM_{10\text{-}2.5}$ 24-hour (nominal) concurrent concentration measurements shall be obtained during each test campaign at each test site. To be considered acceptable for the test, each measurement set shall consist of at least two valid reference method measurements and at least two valid candidate method measurements, and the $PM_{2.5}$ or $PM_{10\text{-}2.5}$ measured concentration, as determined by the average of the reference method measurements, must fall within the acceptable concentration range specified in table C–4 of this subpart. Each measurement set shall include all valid measurements obtained. For each measurement set containing fewer than three reference method measurements or fewer than three candidate method measurements, an explanation and appropriate justification shall be provided to account for the missing measurement or measurements.

(3) More than 23 valid measurement sets may be obtained during a particular test campaign to provide a more advantageous range of concentrations, more representative conditions, additional higher or lower measurements, or to otherwise improve the comparison of the methods. All valid data sets obtained during each test campaign shall be submitted and shall be included in the analysis of the data.

(4) The integrated-sample reference method measurements shall be of at least 22 hours and not more than 25 hours duration. Each reference method sample shall be retrieved promptly after sample collection and analyzed according to the reference method to determine the $PM_{2.5}$ or $PM_{10\text{-}2.5}$ measured concentration in $\mu g/m^3$. Guidance and quality assurance procedures applicable to $PM_{2.5}$ or $PM_{10\text{-}2.5}$ reference methods are found in ''Quality Assurance Document 2.12'' (reference (2) in appendix A to this subpart).

(5) Candidate method measurements shall be timed or processed and averaged as appropriate to determine an equivalent mean concentration representative of the same time period as that of the concurrent integrated-sample reference method measurements, such that all measurements in a measurement set shall be representative of the same time period. In addition, hourly average concentration measurements shall be obtained from each of the Class III candidate method analyzers for each valid measurement set and submitted as part of the application records.

(6) In the following tests, all measurement sets obtained at a particular test site, from both seasonal campaigns if applicable, shall be combined and included in the test data analysis for the site. Data obtained at different test sites shall be analyzed separately. All measurements should be reported as normally obtained, and no measurement values should be rounded or truncated prior to data analysis. In particular, no negative measurement value, if otherwise apparently valid, should be modified, adjusted, replaced, or eliminated merely because its value is negative. Calculated mean concentrations or calculated intermediate quantities should retain at least one order-of-magnitude greater resolution than the input values. All measurement data and calculations shall be recorded and submitted in accordance with § 53.30(g), including hourly test measurements obtained from Class III candidate methods.

(d) *Calculation of mean concentrations.* (1) *Reference method outlier test.* For each of the measurement sets for each test site, check each reference method measurement to see if it might be an anomalous value (outlier) as follows, where $R_{i,j}$ is the measurement of reference method sampler i on test day j. In the event that one of the reference method measurements is missing or invalid due to a specific, positively-identified physical cause (e.g., sampler malfunction, operator error, accidental damage to the filter, etc.; see paragraph (c)(2) of this section), then substitute zero for the missing measurement, *for the purposes of this outlier test only.*

(i) Calculate the quantities $2 \times R_{1,j}/(R_{1,j} + R_{2,j})$ and $2 \times R_{1,j}/(R_{1,j} + R_{3,j})$. If both quantities fall outside of the interval, (0.93, 1.07), then $R_{1,j}$ is an outlier.

(ii) Calculate the quantities $2 \times R_{2,j}/(R_{2,j} + R_{1,j})$ and $2 \times R_{2,j}/(R_{2,j} + R_{3,j})$. If both quantities fall outside of the interval, (0.93, 1.07), then $R_{2,j}$ is an outlier.

(iii) Calculate the quantities $2 \times R_{3,j}/(R_{3,j} + R_{1,j})$ and $2 \times R_{3,j}/(R_{3,j} + R_{2,j})$. If both quantities fall outside of the interval, (0.93, 1.07), then $R_{3,j}$ is an outlier.

(iv) If this test indicates that one of the reference method measurements in the measurement set is an outlier, the outlier measurement shall be eliminated from the measurement set, and the other two measurements considered valid. If the test indicates that more than one reference method measurement in the measurement set is an outlier, the entire measurement set (both reference and candidate method measurements) shall be excluded from further data analysis for the tests of this section.

(2) For each of the measurement sets for each test site, calculate the mean concentration for the reference method measurements, using equation 11 of this section:

Equation 11

$$\bar{R}_j = \frac{1}{n}\sum_{i=1}^{n} R_{i,j}$$

Where:

$\bar{R}_j$ = The mean concentration measured by the reference method for the measurement set;

$R_{i,j}$ = The measurement of reference method sampler i on test day j; and

n =The number of valid reference method measurements in the measurement set (normally 3).

(3) Any measurement set for which $\bar{R}_j$ does not fall in the acceptable concentration range specified in table C–4 of this subpart is not valid, and the entire measurement set (both reference and candidate method measurements) must be eliminated from further data analysis.

(4) For each of the valid measurement sets at each test site, calculate the mean concentration for the candidate method measurements, using equation 12 of this section. (The outlier test in paragraph (d)(1) of this section shall not be applied to the candidate method measurements.)

Equation 12

$$\overline{C}_j = \frac{1}{m}\sum_{i=1}^{m} C_{i,j}$$

where:

C_j = The mean concentration measured by the candidate method for the measurement set;

$C_{i,j}$ = The measurement of candidate method analyzer i on test day j; and

m = The number of valid candidate method measurements in the measurement set (normally 3).

(e) *Test for reference method precision.* (1) For each of the measurement sets for each site, calculate an estimate for the relative precision of the reference method measurements, RP_j, using equation 13 of this section:

Equation 13

$$RP_j = \frac{1}{\overline{R}_j}\sqrt{\frac{\sum_{i=1}^{n} R_{i,j}^2 - \frac{1}{n}\left(\sum_{i=1}^{n} R_{i,j}\right)^2}{n-1}} \times 100\%$$

(2) For each site, calculate an estimate of reference method relative precision for the site, RP, using the *root mean square* calculation of equation 14 of this section:

Equation 14

$$RP = \sqrt{\frac{1}{J}\sum_{j=1}^{J}\left(RP_j\right)^2}$$

where, J is the total number of valid measurement sets for the site.

(3) Verify that the estimate for reference method relative precision for the site, RP, is not greater than the value specified for reference method precision in table C–4 of this subpart. A reference method relative precision greater than the value specified in table C–4 of this subpart indicates that quality control for the reference method is inadequate, and corrective measures must be implemented before proceeding with the test.

(f) *Test for candidate method precision.* (1) For each of the measurement sets, for each site, calculate an estimate for the relative precision of the candidate method measurements, CP_j, using equation 15 of this section:

Equation 15

$$CP_j = \frac{1}{\overline{C}_j}\sqrt{\frac{\sum_{i=1}^{m} C_{i,j}^2 - \frac{1}{m}\left(\sum_{i=1}^{m} C_{i,j}\right)^2}{m-1}} \times 100\%$$

(2) For each site, calculate an estimate of candidate method relative precision for the site, CP, using the *root mean square* calculation of equation 16 of this section:

Equation 16

$$CP = \sqrt{\frac{1}{J}\sum_{j=1}^{J}\left(CP_j\right)^2}$$

where, J is the total number of valid measurement sets for the site.

(3) To pass the test for precision, the mean candidate method relative precision at each site must not be greater than the value for candidate method precision specified in table C–4 of this subpart.

(g) *Test for additive and multiplicative bias (comparative slope and intercept).* (1) For each test site, calculate the mean concentration measured by the reference method, $\overline{R}$, using equation 17 of this section:

Equation 17

$$\overline{R} = \frac{1}{J}\sum_{j=1}^{J}\overline{R}_j$$

(2) For each test site, calculate the mean concentration measured by the candidate method, $\overline{C}$, using equation 18 of this section:

Equation 18

$$\overline{C} = \frac{1}{J}\sum_{j=1}^{J}\overline{C}_j$$

(3) For each test site, calculate the linear regression slope and intercept of the mean candidate method measurements ($\overline{C}_j$) against the mean reference method measurements ($\overline{R}_j$), using equations 19 and 20 of this section, respectively:

Equation 19

$$\text{Slope} = \frac{\sum_{j=1}^{J}\left(\overline{R}_j - \overline{R}\right)\left(\overline{C}_j - \overline{C}\right)}{\sum_{j=1}^{J}\left(\overline{R}_j - \overline{R}\right)^2}$$

Equation 20

$$\text{Intercept} = \overline{C} - \text{slope} \times \overline{R}$$

(4) To pass this test, at each test site:

(i) The slope must be in the interval specified for regression slope in table C–4 of this subpart; and

(ii) The intercept must be in the interval specified for regression intercept in table C–4 of this subpart.

(iii) The slope and intercept limits are illustrated in figures C–2 and C–3 of this subpart.

(h) *Tests for comparison correlation.* (1) For each test site, calculate the (Pearson) correlation coefficient, r (not the coefficient of determination, r^2), using equation 21 of this section:

Equation 21

$$r = \frac{\sum_{j=1}^{J}\left(\overline{R}_j - \overline{R}\right)\left(\overline{C}_j - \overline{C}\right)}{\sqrt{\sum_{j=1}^{J}\left(\overline{R}_j - \overline{R}\right)^2 \sum_{j=1}^{J}\left(\overline{C}_j - \overline{C}\right)^2}}$$

(2) For each test site, calculate the concentration coefficient of variation, CCV, using equation 22 of this section:

Equation 22

$$CCV = \frac{1}{\overline{R}}\sqrt{\frac{\sum_{j=1}^{J}\left(\overline{R}_j - \overline{R}\right)^2}{J-1}}$$

(3) To pass the test, the correlation coefficient, r, for each test site must not be less than the values, for various values of CCV, specified for correlation in table C–4 of this subpart. These limits are illustrated in figure C–4 of this subpart.

11. Tables C–1, C–2, C–3, and C–4 to subpart C are revised to read as follows:

TABLE C–1 TO SUBPART C OF PART 53.—TEST CONCENTRATION RANGES, NUMBER OF MEASUREMENTS REQUIRED, AND MAXIMUM DISCREPANCY SPECIFICATION

Pollutant	Concentration range parts per million	Simultaneous measurements required				Maximum discrepancy specification, parts per million
		1-hr		24-hr		
		First set	Second set	First set	Second set	
Ozone	Low 0.06 to 0.10	5	6			0.02
	Med 0.15 to 0.25	5	6			.03
	High 0.35 to 0.45	4	6			.04
	Total	14	18			
Carbon monoxide	Low 7 to 11	5	6			1.5
	Med 20 to 30	5	6			2.0
	High 35 to 45	4	6			3.0
	Total	14	18			
Sulfur dioxide	Low 0.02 to 0.05			3	3	0.02
	Med 0.10 to 0.15			2	3	.03
	High 0.30 to 0.50	7	8	2	2	.04
	Total	7	8	7	8	
Nitrogen dioxide	Low 0.02 to 0.08			3	3	0.02
	Med 0.10 to 0.20			2	3	.03
	High 0.25 to 0.35			2	2	.03
	Total			7	8	

TABLE C–2 TO SUBPART C OF PART 53.—SEQUENCE OF TEST MEASUREMENTS

Measurement	Concentration range	
	First set	Second set
1	Low	Medium.
2	High	High.
3	Medium	Low.
4	High	High.
5	Low	Medium.
6	Medium	Low.
7	Low	Medium.
8	Medium	Low.
9	High	High.
10	Medium	Low.
11	High	Medium.
12	Low	High.
13	Medium	Medium.
14	Low	High.
15		Low.
16		Medium.
17		Low.
18		High.

TABLE C–3 TO SUBPART C OF PART 53.—TEST SPECIFICATIONS FOR PB METHODS

Concentration range, µg/m^3	0.5–4.0
Minimum number of 24-hr measurements	5
Maximum analytical precision, percent	15
Maximum analytical accuracy, percent	±5
Maximum difference, percent of reference method	±20

TABLE C–4 TO SUBPART C.—TEST SPECIFICATIONS FOR PM_{10}, $PM_{2.5}$ AND $PM_{10-2.5}$ CANDIDATE EQUIVALENT METHODS

Specification	PM_{10}	$PM_{2.5}$			$PM_{10-2.5}$	
		Class I	Class II	Class III	Class II	Class III
Acceptable concentration range (R_j), µg/m^3.	15–300	3–200	3–200	3–200	3–200	3–200
Minimum number of test sites	2	1	2	3	2	3
Minimum number of candidate method samplers or analyzers per site.	3	3	3[1]	3[1]	3[1]	3[1]
Number of reference method samplers per site.	3	3	3[1]	3[1]	3[1]	3[1]
Minimum number of acceptable sample sets per site for PM_{10} methods:.						
R_j < 60 µg/m^3	3					
R_j > 60 µg/m^3	3					
Total	10					
Minimum number of acceptable sample sets per site for $PM_{2.5}$ and $PM_{10-2.5}$ candidate equivalent methods:.						
R_j < 30 µg/m^3 for 24-hr or R_j < 20 µg/m^3 for 48-hr samples.		3				

TABLE C–4 TO SUBPART C.—TEST SPECIFICATIONS FOR PM_{10}, $PM_{2.5}$ AND $PM_{10\text{-}2.5}$ CANDIDATE EQUIVALENT METHODS—Continued

Specification	PM_{10}	$PM_{2.5}$			$PM_{10\text{-}2.5}$	
		Class I	Class II	Class III	Class II	Class III
$R_j > 30$ µg/m³ for 24-hr or $R_j > 20$ µg/m³ for 48-hr samples.		3				
Each season		10	23	23	23	23
Total, each site		10	23	46 (23 for single season site).	23	46 (23 for single season site)
Precision of replicate reference method measurements, P_{Rj} or RP_{Rj}, respectively; RP for Class II or III $PM_{2.5}$ or $PM_{10\text{-}2.5}$, maximum.	5 µg/m³ or 7%	2 µg/m³ or 5%	10% [2]	10% [2]	10% [2]	10% [2]
Precision of $PM_{2.5}$ or $PM_{10\text{-}2.5}$ candidate method, CP, each site.			10% [2]	15% [2]	15% [2]	15% [2]
Slope of regression relationship.	1±0.1	1±0.05	1±0.10	1±0.10	1±0.10	1±0.12
Intercept of regression relationship, µg/m³.	0±5	0±1	Between: 13.55 − (15.05 × slope), but not less than −1.5; and 16.56 − (15.05 × slope), but not more than +1.5.	Between: 15.05 − (17.32 × slope); and 15.05 − (13.20 × slope).	Between: 59.93 − (70.50 × slope), but not less than −7.0; and 81.08 − (70.50 × slope), but not more than +7.0.	Between: 70.50 − (82.93 × slope); and 70.50 − (61.16 × slope)
Correlation of reference method and candidate method measurements.	≥0.97	≥0.97	≥0.93 for CCV≤0.4; ≥0.85+0.2×CCV for 0.4≤CCV≤0.5; ≥0.95 for CCV≥0.5			

[1] Some missing daily measurement values may be permitted; see test procedure.

[2] Calculated as the root mean square over all measurement sets.

11. Figure C–1 to subpart C is revised to read as follows:

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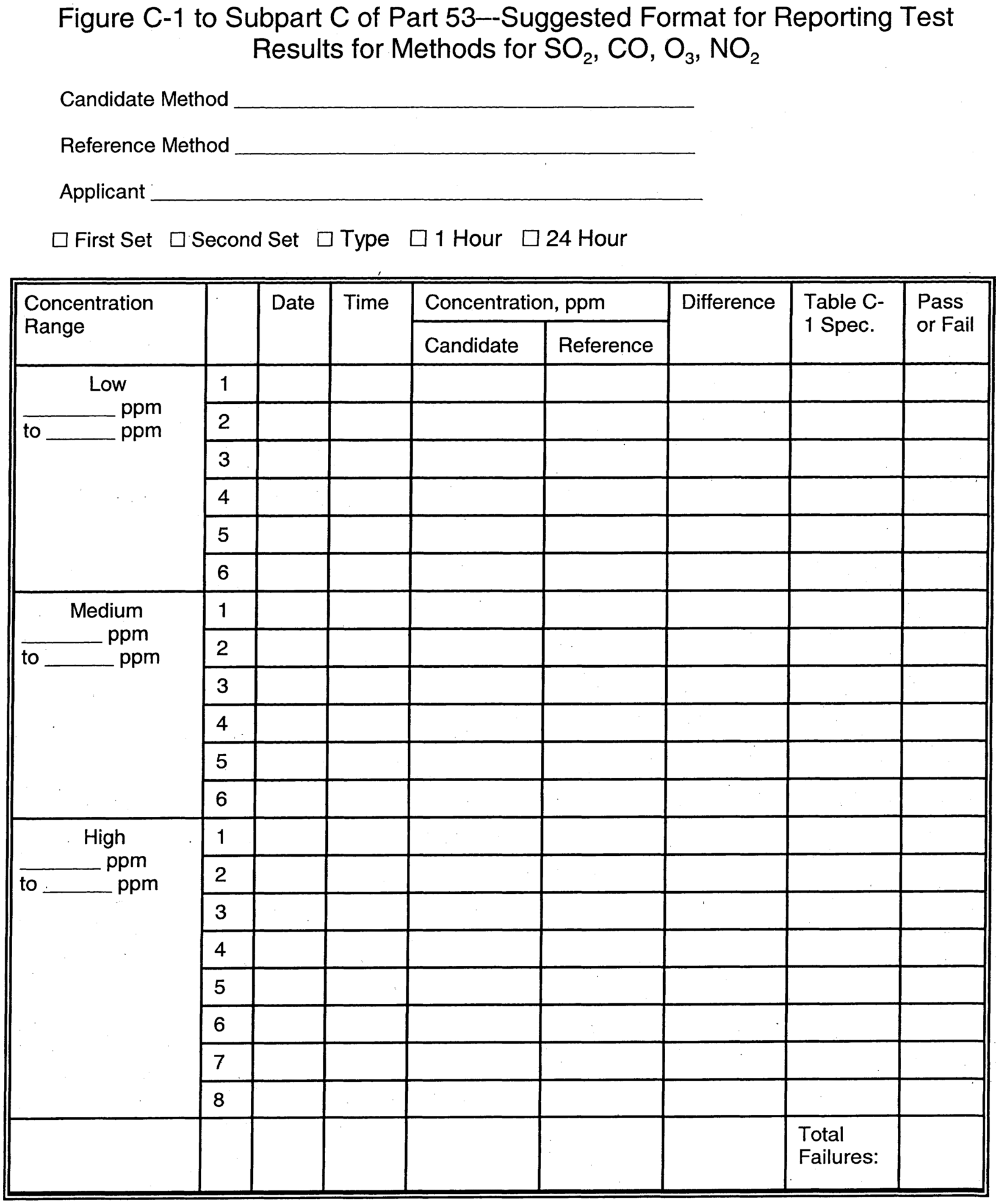


Figure C-1 to Subpart C of Part 53--Suggested Format for Reporting Test Results for Methods for SO_2, CO, O_3, NO_2

Candidate Method ________________________________

Reference Method ________________________________

Applicant ____________________________________

☐ First Set ☐ Second Set ☐ Type ☐ 1 Hour ☐ 24 Hour

Concentration Range		Date	Time	Concentration, ppm		Difference	Table C-1 Spec.	Pass or Fail
				Candidate	Reference			
Low ________ ppm to ______ ppm	1							
	2							
	3							
	4							
	5							
	6							
Medium _______ ppm to ______ ppm	1							
	2							
	3							
	4							
	5							
	6							
High _______ ppm to ______ ppm	1							
	2							
	3							
	4							
	5							
	6							
	7							
	8							
							Total Failures:	

13. Figures C–2, C–3, and C–4 are added to subpart C to read as follows:

FIGURE C-2 TO SUBPART C OF PART 53–ILLUSTRATION OF THE SLOPE AND INTERCEPT LIMITS FOR CLASS II AND CLASS III $PM_{2.5}$ CANDIDATE EQUIVALENT METHODS.

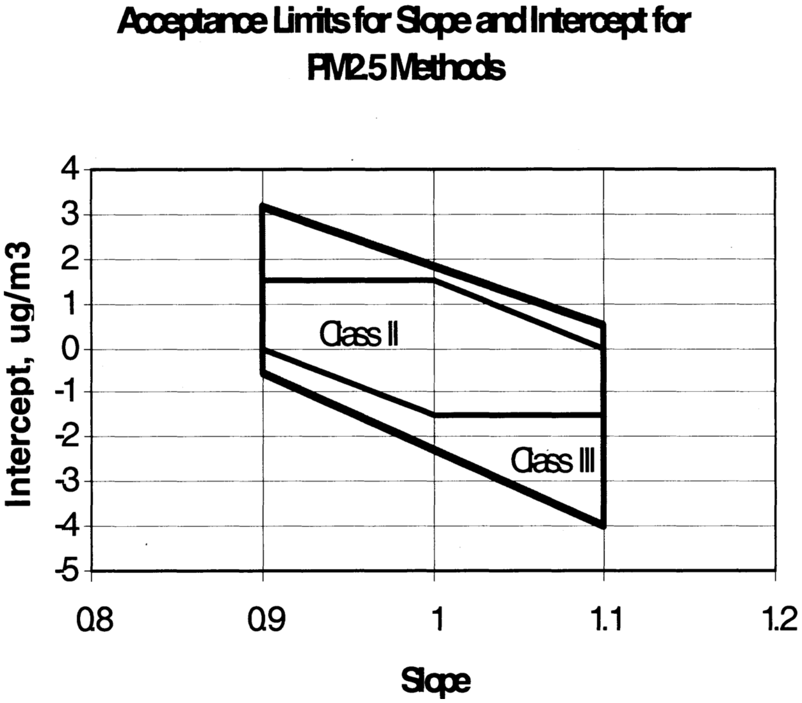


FIGURE C-3 TO SUBPART C OF PART 53–ILLUSTRATION OF THE SLOPE AND INTERCEPT LIMITS FOR CLASS II AND CLASS III $PM_{10-2.5}$ CANDIDATE EQUIVALENT METHODS.

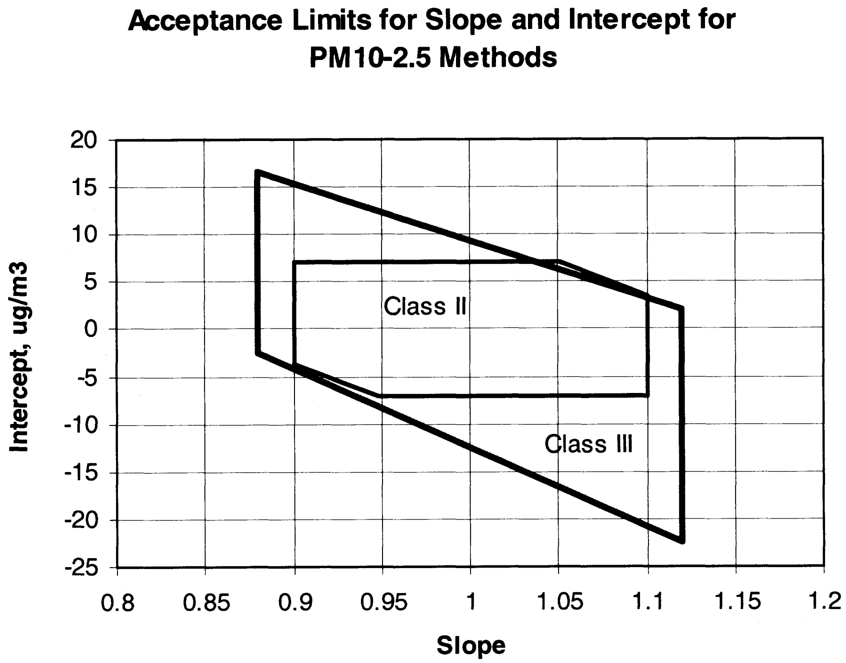
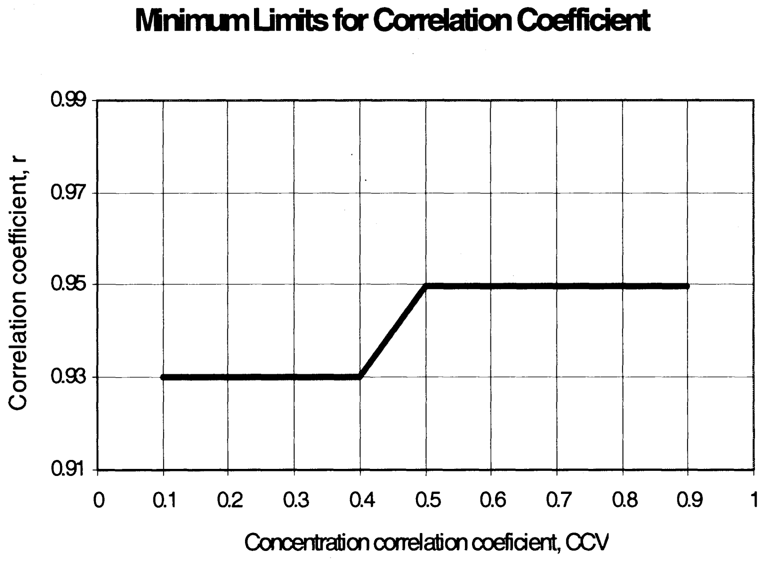


FIGURE C-4 TO SUBPART C OF PART 53–ILLUSTRATION OF THE MINIMUM LIMITS FOR CORRELATION COEFFICIENT FOR $PM_{2.5}$ AND $PM_{10\text{-}2.5}$ CLASS II AND III METHODS.



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14. Appendix A to subpart C is amended by adding reference (2) to read as follows:

Appendix A to Subpart C—References

* * * * *

(2) Quality Assurance Guidance Document 2.12. Monitoring $PM_{2.5}$ in Ambient Air Using Designated Reference or Class I Equivalent Methods. U.S. EPA, National Exposure Research Laboratory, Research Triangle Park, NC, November 1998 or later edition. Currently available at *http://www.epa.gov/ttn/amtic/pmqainf.html.*

Subpart E—Procedures for Testing Physical (Design) andPerformance Characteristics of Reference Methods and Class I and Class II Equivalent Methods for PM2.5 or PM10-2.5

15. The heading for subpart E is revised as set out above.

16. Section 53.50 is revised to read as follows:

§ 53.50 General provisions.

(a) A candidate method for $PM_{2.5}$ or $PM_{10\text{-}2.5}$ described in an application for a reference or equivalent method determination submitted under § 53.4 shall be determined by the EPA to be a reference method or a Class I, II, or III equivalent method on the basis of the definitions for such methods given in § 53.1. This subpart sets forth the specific tests that must be carried out and the test results, evidence, documentation, and other materials that must be provided to EPA to demonstrate that a $PM_{2.5}$ or $PM_{10\text{-}2.5}$ sampler associated with a candidate reference method or Class I or Class II equivalent method meets all design and performance specifications set forth in appendix L or O, respectively, of part 50 of this chapter as well as additional requirements specified in this subpart E. Some or all of these tests may also be applicable to a candidate Class III equivalent method or analyzer, as may be determined under § 53.3(b)(3).

(b) *$PM_{2.5}$ methods.* (1) *Reference method.* A sampler associated with a candidate reference method for $PM_{2.5}$ shall be subject to the provisions, specifications, and test procedures prescribed in §§ 53.51 through 53.58.

(2) *Class I method.* A sampler associated with a candidate Class I equivalent method for $PM_{2.5}$ shall be subject to the provisions, specifications, and test procedures prescribed in all sections of this subpart.

(3) *Class II method.* A sampler associated with a candidate Class II equivalent method for $PM_{2.5}$ shall be subject to the provisions, specifications, and test procedures prescribed in all applicable sections of this subpart, as specified in subpart F of this part or as specified in § 53.3(a)(3).

(c) *$PM_{10\text{-}2.5}$ methods.* (1) *Reference method.* A sampler associated with a reference method for $PM_{10\text{-}2.5}$, as specified in appendix O to part 50 of this chapter, shall be subject to the requirements in this paragraph (c)(1).

(i) The $PM_{2.5}$ sampler of the $PM_{10\text{-}2.5}$ sampler pair shall be verified to be either currently designated under this part 53 as a reference method for $PM_{2.5}$, or shown to meet all requirements for designation as a reference method for $PM_{2.5}$, in accordance with this part 53.

(ii) The PM_{10c} sampler of the $PM_{10\text{-}2.5}$ sampler pair shall be verified to be of like manufacturer, design, configuration, and fabrication to the $PM_{2.5}$ sampler of the $PM_{10\text{-}2.5}$ sampler pair, except for replacement of the particle size separator specified in section 7.3.4 of appendix L to part 50 of this chapter with the downtube extension as specified in Figure O–1 of appendix O to part 50 of this chapter.

(iii) For samplers that meet the provisions of paragraphs (c)(1)(i) and (ii) of this section, the candidate $PM_{10\text{-}2.5}$ reference method may be determined to be a reference method without further testing.

(2) *Class I method.* A sampler associated with a Class I candidate equivalent method for $PM_{10\text{-}2.5}$ shall meet the requirements in this paragraph (c)(2).

(i) The $PM_{2.5}$ sampler of the $PM_{10\text{-}2.5}$ sampler pair shall be verified to be either currently designated under this part 53 as a reference method or Class I equivalent method for $PM_{2.5}$, or shown to meet all requirements for designation as a reference method or Class I equivalent method for $PM_{2.5}$, in accordance with this part 53.

(ii) The PM_{10c} sampler of the $PM_{10\text{-}2.5}$ sampler pair shall be verified to be of similar design to the $PM_{10\text{-}2.5}$ sampler and to meet all requirements for designation as a reference method or Class I equivalent method for $PM_{2.5}$, in accordance with this part 53, except for replacement of the particle size separator specified in section 7.3.4 of appendix L to part 50 of this chapter with the downtube extension as specified in Figure O–1 of appendix O to part 50 of this chapter.

(iii) For samplers that meet the provisions of paragraphs (c)(2)(i) and (ii) of this section, the candidate $PM_{10\text{-}2.5}$ method may be determined to be a Class I equivalent method without further testing.

(3) *Class II method.* A sampler associated with a Class II candidate equivalent method for $PM_{10\text{-}2.5}$ shall be subject to the applicable requirements of this subpart E, as described in § 53.3(a)(5).

(d) The provisions of § 53.51 pertain to test results and documentation required to demonstrate compliance of a candidate method sampler with the design specifications set forth in 40 CFR part 50, appendix L or O, as applicable. The test procedures prescribed in §§ 53.52 through 53.59 pertain to performance tests required to demonstrate compliance of a candidate method sampler with the performance specifications set forth in 40 CFR part 50, appendix L or O, as applicable, as well as additional requirements specified in this subpart E. These latter test procedures shall be used to test the performance of candidate samplers against the performance specifications and requirements specified in each procedure and summarized in table E–1 of this subpart.

(e) Test procedures prescribed in § 53.59 do not apply to candidate reference method samplers. These procedures apply primarily to candidate Class I or Class II equivalent method samplers for $PM_{2.5}$ or $PM_{10\text{-}2.5}$ that have a sample air flow path configuration upstream of the sample filter that is modified from that specified for the reference method sampler, as set forth in 40 CFR part 50, appendix L, Figures L–1 to L–29 or 40 CFR part 50 appendix O, Figure O–1, if applicable, such as might be necessary to provide for sequential sample capability. The additional tests determine the adequacy of aerosol transport through any altered components or supplemental devices that are used in a candidate sampler upstream of the filter. In addition to the other test procedures in this subpart, these test procedures shall be used to further test the performance of such an equivalent method sampler against the performance specifications given in the procedure and summarized in table E–1 of this subpart.

(f) A 10-day operational field test of measurement precision is required under § 53.58 for both reference and Class I equivalent method samplers for $PM_{2.5}$. This test requires collocated operation of 3 candidate method samplers at a field test site. For candidate equivalent method samplers, this test may be combined and carried out concurrently with the test for comparability to the reference method specified under § 53.34, which requires collocated operation of three reference method samplers and three candidate equivalent method samplers.

(g) All tests and collection of test data shall be performed in accordance with the requirements of reference 1, section 4.10.5 (ISO 9001) and reference 2, part B, section 3.3.1, paragraphs 1 and 2 and Part C, section 4.6 (ANSI/ASQC E4) in appendix A of this subpart. All test data and other documentation obtained specifically from or pertinent to these tests shall be identified, dated, signed by the analyst performing the test, and submitted to EPA in accordance with subpart A of this part.

17. Section 53.51 is revised to read as follows:

§ 53.51 Demonstration of compliance with design specifications and manufacturing and test requirements.

(a) *Overview.* (1) The subsequent paragraphs of this section specify certain documentation that must be submitted and tests that are required to demonstrate that samplers associated with a designated reference or equivalent method for $PM_{2.5}$ or $PM_{10\text{-}2.5}$ are properly manufactured to meet all applicable design and performance specifications and have been properly tested according to all applicable test requirements for such designation. Documentation is required to show that instruments and components of a $PM_{2.5}$ or $PM_{10\text{-}2.5}$ sampler are manufactured in an ISO 9001-registered facility under a quality system that meets ISO–9001 requirements for manufacturing quality control and testing.

(2) In addition, specific tests are required by paragraph (d) of this section to verify that critical features of reference method samplers—the particle size separator and the surface finish of surfaces specified to be anodized—meet the specifications of 40 CFR part 50, appendix L or appendix O, as applicable. A checklist is required to provide certification by an ISO-certified auditor that all performance and other required tests have been properly and appropriately conducted, based on a reasonable and appropriate sample of the actual operations or their documented records. Following designation of the method, another checklist is required initially to provide an ISO-certified auditor's certification that the sampler manufacturing process is being implemented under an adequate and appropriate quality system.

(3) For the purposes of this section, the definitions of ISO 9001-registered facility and ISO-certified auditor are found in § 53.1. An exception to the reliance by EPA on ISO-certified auditors is the requirement for the submission of the operation or instruction manual associated with the candidate method to EPA as part of the application. This manual is required under § 53.4(b)(3). The EPA has determined that acceptable technical judgment for review of this manual may not be assured by ISO-certified auditors, and approval of this manual will therefore be performed by EPA.

(b) *ISO registration of manufacturing facility.* The applicant must submit documentation verifying that the samplers identified and sold as part of a designated $PM_{2.5}$ or $PM_{10\text{-}2.5}$ reference or equivalent method will be manufactured in an ISO 9001-registered facility and that the manufacturing facility is maintained in compliance with all applicable ISO 9001 requirements (reference 1 in appendix A of this subpart). The documentation shall indicate the date of the original ISO 9001 registration for the facility and shall include a copy of the most recent certification of continued ISO 9001 facility registration. If the manufacturer does not wish to initiate or complete ISO 9001 registration for the manufacturing facility, documentation must be included in the application to EPA describing an alternative method to demonstrate that the facility meets the same general requirements as required for registration to ISO–9001. In this case, the applicant must provide documentation in the application to demonstrate, by required ISO-certified auditor's inspections, that a quality system is in place which is adequate to document and monitor that the sampler system components and final assembled samplers all conform to the design, performance and other requirements specified in this part and in 40 CFR part 50, appendix L.

(c) *Sampler manufacturing quality control.* The manufacturer must ensure that all components used in the manufacture of $PM_{2.5}$ or $PM_{10-2.5}$ samplers to be sold as part of a reference or equivalent method and that are specified by design in 40 CFR part 50, appendix L or O (as applicable), are fabricated or manufactured exactly as specified. If the manufacturer's quality records show that its quality control (QC) and quality assurance (QA) system of standard process control inspections (of a set number and frequency of testing that is less than 100 percent) complies with the applicable QA provisions of section 4 of reference 4 in appendix A of this subpart and prevents nonconformances, 100 percent testing shall not be required until that conclusion is disproved by customer return or other independent manufacturer or customer test records. If problems are uncovered, inspection to verify conformance to the drawings, specifications, and tolerances shall be performed. Refer also to paragraph (e) of this section-final assembly and inspection requirements.

(d) *Specific tests and supporting documentation required to verify conformance to critical component specifications.* (1) *Verification of $PM_{2.5}$ (WINS) impactor jet diameter.* For samplers utilizing the WINS impactor particle size separator specified in paragraphs 7.3.4.1, 7.3.4.2, and 7.3.4.3 of appendix L to part 50 of this chapter, the diameter of the jet of each impactor manufactured for a $PM_{2.5}$ or $PM_{10-2.5}$ sampler under the impactor design specifications set forth in 40 CFR part 50, appendix L, shall be verified against the tolerance specified on the drawing, using standard, NIST-traceable ZZ go/no go plug gages. This test shall be a final check of the jet diameter following all fabrication operations, and a record shall be kept of this final check. The manufacturer shall submit evidence that this procedure is incorporated into the manufacturing procedure, that the test is or will be routinely implemented, and that an appropriate procedure is in place for the disposition of units that fail this tolerance test.

(2) *VSCC separator.* For samplers utilizing the BGI VSCC™ Very Sharp Cut Cyclone particle size separator specified in paragraph 7.3.4.4 of appendix L to part 50 of this chapter, the VSCC manufacturer shall identify the critical dimensions and manufacturing tolerances for the device, develop appropriate test procedures to verify that the critical dimensions and tolerances are maintained during the manufacturing process, and carry out those procedures on each VSCC manufactured to verify conformance of the manufactured products. The manufacturer shall also maintain records of these tests and their results and submit evidence that this procedure is incorporated into the manufacturing procedure, that the test is or will be routinely implemented, and that an appropriate procedure is in place for the disposition of units that fail this tolerance test.

(3) *Verification of surface finish.* The anodization process used to treat surfaces specified to be anodized shall be verified by testing treated specimen surfaces for weight and corrosion resistance to ensure that the coating obtained conforms to the coating specification. The specimen surfaces shall be finished in accordance with military standard specification 8625F, Type II, Class I (reference 4 in appendix A of this subpart) in the same way the sampler surfaces are finished, and tested, prior to sealing, as specified in section 4.5.2 of reference 4 in appendix A of this subpart.

(e) *Final assembly and inspection requirements.* Each sampler shall be tested after manufacture and before delivery to the final user. Each manufacturer shall document its post-manufacturing test procedures. As a minimum, each test shall consist of the following: Tests of the overall integrity of the sampler, including leak tests; calibration or verification of the calibration of the flow measurement device, barometric pressure sensor, and temperature sensors; and operation of the sampler with a filter in place over a period of at least 48 hours. The results of each test shall be suitably documented and shall be subject to review by an ISO-certified auditor.

(f) *Manufacturer's audit checklists.* Manufacturers shall require an ISO-certified auditor to sign and date a statement indicating that the auditor is aware of the appropriate manufacturing specifications contained in 40 CFR part 50, appendix L or O (as applicable), and the test or verification requirements in this subpart. Manufacturers shall also require an ISO-certified auditor to complete the checklists, shown in figures E–1 and E–2 of this subpart, which describe the manufacturer's ability to meet the requirements of the standard for both designation testing and product manufacture.

(1) *Designation testing checklist.* The completed statement and checklist as shown in figure E–1 of this subpart shall be submitted with the application for reference or equivalent method determination.

(2) *Product manufacturing checklist.* Manufacturers shall require an ISO-certified auditor to complete a Product Manufacturing Checklist (figure E–2 of this subpart), which evaluates the manufacturer on its ability to meet the requirements of the standard in maintaining quality control in the production of reference or equivalent devices. The completed checklist shall be submitted with the application for reference or equivalent method determination.

18. Section 53.52 is amended by revising paragraph (e)(1) to read as follows:

§ 53.52 Leak check test.

* * * * *

(e) *Test setup.* (1) The test sampler shall be set up for testing as described in the sampler's operation or instruction manual referred to in § 53.4(b)(3). The sampler shall be installed upright and set up in its normal configuration for collecting PM samples, except that the sample air inlet shall be removed and the flow rate measurement adaptor shall be installed on the sampler's downtube.

* * * * *

19. Section 53.53 is amended by revising paragraph (e)(1) to read as follows:

§ 53.53 Test for flow rate accuracy, regulation, measurement accuracy, and cut-off.

* * * * *

(e) *Test setup.* (1) Setup of the sampler shall be as required in this paragraph (e) and otherwise as described in the sampler's operation or instruction manual referred to in § 53.4(b)(3). The sampler shall be installed upright and set up in its normal configuration for collecting PM samples. A sample filter and (or) the device for creating an additional 55 mm Hg pressure drop shall be installed for the duration of these tests. The sampler's ambient temperature, ambient pressure, and flow rate measurement systems shall all be calibrated per the sampler's operation or instruction manual within 7 days prior to this test.

* * * * *

20. Section 53.54 is amended by revising paragraph (d)(1) to read as follows:

§ 53.54 Test for proper sampler operation following power interruptions.

* * * * *

(d) *Test setup.* (1) Setup of the sampler shall be performed as required in this paragraph (d) and otherwise as described in the sampler's operation or instruction manual referred to in § 53.4(b)(3). The sampler shall be installed upright and set up in its normal configuration for collecting PM samples. A sample filter and (or) the device for creating an additional 55 mm Hg pressure drop shall be installed for the duration of these tests. The sampler's ambient temperature, ambient pressure, and flow measurement systems shall all be calibrated per the sampler's operating manual within 7 days prior to this test.

* * * * *

21. Section 53.55 is amended as follows:

a. By revising paragraphs (a)(1) introductory text and (a)(2).

b. By revising paragraph (e)(1).

c. By revising paragraph (g)(5)(i).

§ 53.55 Test for effect of variations in power line voltage and ambient temperature.

(a) *Overview.* (1) This test procedure is a combined procedure to test various performance parameters under variations in power line voltage and ambient temperature. Tests shall be conducted in a temperature controlled environment over four 6-hour time periods during which reference temperature and flow rate measurements shall be made at intervals not to exceed 5 minutes. Specific parameters to be evaluated at line voltages of 105 and 125 volts and temperatures of −20 °C and +40 °C are as follows:

* * * * *

(2) The performance parameters tested under this procedure, the corresponding minimum performance specifications, and the applicable test conditions are summarized in table E–1 of this subpart. Each performance parameter tested, as described or determined in the test procedure, must meet or exceed the associated performance specification given. The candidate sampler must meet all specifications for the associated $PM_{2.5}$ or $PM_{10-2.5}$ method (as applicable) to pass this test procedure.

* * * * *

(e) * * * (1) Setup of the sampler shall be performed as required in this paragraph (e) and otherwise as described in the sampler's operation or instruction manual referred to in § 53.4(b)(3). The sampler shall be installed upright and set up in the temperature-controlled chamber in its normal configuration for collecting PM samples. A sample filter and (or) the device for creating an additional 55 mm Hg pressure drop shall be installed for the duration of these tests. The sampler's ambient temperature, ambient pressure, and flow measurement systems shall all be calibrated per the sampler's operating manual within 7 days prior to this test.

* * * * *

(g) * * *

(5) * * * (i) Calculate the absolute value of the difference between the mean ambient air temperature indicated by the test sampler and the mean ambient (chamber) air temperature measured with the ambient air temperature recorder as:

Equation 16

$$T_{diff} = \left| T_{ind,ave} - T_{ref,ave} \right|$$

Where:

$T_{ind,ave}$ = mean ambient air temperature indicated by the test sampler,°C; and

$T_{ref,ave}$ = mean ambient air temperature measured by the reference temperature instrument,°C.

* * * * *

22. Section 53.56 is amended by revising paragraphs (a)(2) and (e)(1) to read as follows:

§ 53.56 Test for effect of variations in ambient pressure.

(a) * * *

(2) The performance parameters tested under this procedure, the corresponding minimum performance specifications, and the applicable test conditions are summarized in table E–1 of this subpart. Each performance parameter tested, as described or determined in the test procedure, must meet or exceed the associated performance specification given. The candidate sampler must meet all specifications for the associated $PM_{2.5}$ or $PM_{10-2.5}$ method (as applicable) to pass this test procedure.

* * * * *

(e) * * * (1) Setup of the sampler shall be performed as required in this paragraph (e) and otherwise as described in the sampler's operation or instruction manual referred to in § 53.4(b)(3). The sampler shall be installed upright and set up in the pressure-controlled chamber in its normal configuration for collecting PM samples. A sample filter and (or) the device for creating an additional 55 mm Hg pressure drop shall be installed for the duration of these tests. The sampler's ambient temperature, ambient pressure, and flow measurement systems shall all be calibrated per the sampler's operating manual within 7 days prior to this test.

* * * * *

23. Section 53.57 is amended by revising paragraphs (a), (b), and (e)(1) to read as follows:

§ 53.57 Test for filter temperature control during sampling and post-sampling periods.

(a) *Overview.* This test is intended to measure the candidate sampler's ability to prevent excessive overheating of the PM sample collection filter (or filters) under conditions of elevated solar insolation. The test evaluates radiative effects on filter temperature during a 4-hour period of active sampling as well as during a subsequent 4-hour non-sampling time period prior to filter retrieval. Tests shall be conducted in an environmental chamber which provides the proper radiant wavelengths and energies to adequately simulate the sun's radiant effects under clear conditions at sea level. For additional guidance on conducting solar radiative tests under controlled conditions, consult military standard specification 810–E (reference 6 in appendix A of this subpart). The performance parameters tested under this procedure, the corresponding minimum performance specifications, and the applicable test conditions are summarized in table E–1 of this subpart. Each performance parameter tested, as described or determined in the test procedure, must meet or exceed the associated performance specification to successfully pass this test.

(b) *Technical definition.* Filter temperature control during sampling is the ability of a sampler to maintain the temperature of the particulate matter sample filter within the specified deviation (5 °C) from ambient temperature during any active sampling period. Post-sampling temperature control is the ability of a sampler to maintain the temperature of the particulate matter sample filter within the specified deviation from ambient temperature during the period from the end of active sample collection by the sampler until the filter is retrieved from the sampler for laboratory analysis.

* * * * *

(e) * * * (1) Setup of the sampler shall be performed as required in this paragraph (e) and otherwise as described in the sampler's operation or instruction manual referred to in § 53.4(b)(3). The sampler shall be installed upright and set up in the solar radiation environmental chamber in its normal configuration for collecting PM samples (with the inlet installed). The sampler's ambient and filter temperature measurement systems shall be calibrated per the sampler's operating manual within 7 days prior to this test. A sample filter shall be installed for the duration of this test. For sequential samplers, a sample filter shall also be installed in each available sequential channel or station intended for collection of a sequential sample (or at least 5 additional filters for magazine-type sequential samplers) as directed by the sampler's operation or instruction manual.

* * * * *

24. Section 53.58 is revised to read as follows:

§ 53.58 Operational field precision and blank test.

(a) *Overview.* This test is intended to determine the operational precision of the candidate sampler during a minimum of 10 days of field operation, using three collocated test samplers. Measurements of PM are made at a test site with all of the samplers and then compared to determine replicate precision. Candidate sequential samplers are also subject to a test for possible deposition of particulate matter on inactive filters during a period of storage in the sampler. This procedure is applicable to both reference and equivalent methods. In the case of equivalent methods, this test may be combined and conducted concurrently with the comparability test for equivalent methods (described in subpart C of this part), using three reference method samplers collocated with three candidate equivalent method samplers and meeting the applicable site and other requirements of subpart C of this part.

(b) *Technical definition.* (1) Field precision is defined as the standard deviation or relative standard deviation of a set of PM measurements obtained concurrently with three or more collocated samplers in actual ambient air field operation.

(2) Storage deposition is defined as the mass of material inadvertently deposited on a sample filter that is stored in a sequential sampler either prior to or subsequent to the active sample collection period.

(c) *Test site.* Any outdoor test site having $PM_{2.5}$ (or $PM_{10-2.5}$, as applicable) concentrations that are reasonably uniform over the test area and that meet the minimum level requirement of paragraph (g)(2) of this section is acceptable for this test.

(d) *Required facilities and equipment.* (1) An appropriate test site and suitable electrical power to accommodate three test samplers are required.

(2) Teflon sample filters, as specified in section 6 of 40 CFR part 50, appendix L, conditioned and preweighed as required by section 8 of 40 CFR part 50, appendix L, as needed for the test samples.

(e) *Test setup.* (1) Three identical test samplers shall be installed at the test site in their normal configuration for collecting PM samples in accordance with the instructions in the associated manual referred to in § 53.4(b)(3) and also in accordance with applicable supplemental guidance provided in reference 3 in appendix A of this subpart. The test samplers' inlet openings shall be located at the same height above ground and between 2 (1 for samplers with flow rates less than 200 L/min.) and 4 meters apart horizontally. The samplers shall be arranged or oriented in a manner that will minimize the spatial and wind directional effects on sample collection of one sampler on any other sampler.

(2) Each test sampler shall be successfully leak checked, calibrated, and set up for normal operation in accordance with the instruction manual and with any applicable supplemental guidance provided in reference 3 in appendix A of this subpart.

(f) *Test procedure.* (1) Install a conditioned, preweighed filter in each test sampler and otherwise prepare each sampler for normal sample collection. Set identical sample collection start and stop times for each sampler. For sequential samplers, install a conditioned, preweighed specified filter in each available channel or station intended for automatic sequential sample filter collection (or at least 5 additional filters for magazine-type sequential samplers), as directed by the sampler's operation or instruction manual. Since the inactive sequential channels are used for the storage deposition part of the test, they may not be used to collect the active PM test samples.

(2) Collect either a nominal 24-hour or 48-hour atmospheric PM sample simultaneously with each of the three test samplers.

(3) Following sample collection, retrieve the collected sample from each sampler. For sequential samplers, retrieve the additional stored (blank, unsampled) filters after at least 5 days (120 hours) storage in the sampler if the active samples are 24-hour samples, or after at least 10 days (240 hours) if the active samples are 48-hour samples.

(4) Determine the measured PM mass concentration for each sample in accordance with the applicable procedures prescribed for the candidate method in appendix L or appendix O, as applicable, of part 50 of this chapter, or in accordance with the associated manual referred to in § 53.4(b)(3) and supplemental guidance in reference 2 in appendix A of this subpart. For sequential samplers, also similarly determine the storage deposition as the net weight gain of each blank, unsampled filter after the 5-day (or 10-day) period of storage in the sampler.

(5) Repeat this procedure to obtain a total of 10 sets of any combination of (nominal) 24-hour or 48-hour PM measurements over 10 test periods. For sequential samplers, repeat the 5-day (or 10-day) storage test of additional blank filters once for a total of two sets of blank filters.

(g) *Calculations.* (1) Record the PM concentration for each test sampler for each test period as $C_{i,j}$, where i is the sampler number (i = 1,2,3) and j is the test period (j = 1,2, * * * 10).

(2)(i) For each test period, calculate and record the average of the three measured PM concentrations as $C_{ave,j}$ where j is the test period using equation 26 of this section:

Equation 26

$$C_{ave,j} = \frac{1}{3} \times \sum_{i=1}^{3} C_{i,j}$$

(ii) If $C_{ave,j} < 3\ \mu g/m^3$ for any test period, data from that test period are unacceptable, and an additional sample collection set must be obtained to replace the unacceptable data.

(3)(i) Calculate and record the precision for each of the 10 test periods, as the standard deviation, using equation 27 of this section:

Equation 27

$$P_j = \sqrt{\frac{\sum_{i=1}^{3} C_{i,j}^2 - \frac{1}{3}\left(\sum_{i=1}^{3} C_{i,j}\right)^2}{2}}$$

(ii) For each of the 10 test periods, also calculate and record the precision as the relative standard deviation, in percent, using equation 28 of this section:

Equation 28

$$RP_j = 100\% \times \frac{P_j}{C_{ave,j}}$$

(h) *Test results.* (1) The candidate method passes the precision test if either P_j or RP_j is less than or equal to the corresponding specification in table E–1 of this subpart for all 10 test periods.

(2) The candidate sequential sampler passes the blank filter storage deposition test if the average net storage deposition weight gain of each set of blank filters (total of the net weight gain of each blank filter divided by the number of filters in the set) from each test sampler (six sets in all) is less than 50 µg.

25. Section 53.59 is amended by revising paragraphs (a) and (b)(5) to read as follows:

§ 53.59 Aerosol transport test for Class I equivalent method samplers.

(a) *Overview.* This test is intended to verify adequate aerosol transport through any modified or air flow splitting components that may be used in a Class I candidate equivalent method sampler such as may be necessary to achieve sequential sampling capability. This test is applicable to all Class I candidate samplers in which the aerosol flow path (the flow path through which sample air passes upstream of sample collection filter) differs significantly from that specified for reference method samplers as specified in 40 CFR part 50, appendix L or appendix O, as applicable. The test requirements and performance specifications for this test are summarized in table E–1 of this subpart.

(b) * * *

(5) An added component is any physical part of the sampler which is different in some way from that specified for a reference method sampler in 40 CFR part 50, appendix L or appendix O, as applicable, such as a device or means to allow or cause the aerosol to be routed to one of several channels.

* * * * *

26. Table E–1 to subpart E is revised to read as follows:

TABLE E–1 TO SUBPART E.—SUMMARY OF TEST REQUIREMENTS FOR REFERENCE AND CLASS I EQUIVALENT METHODS FOR $PM_{2.5}$ AND $PM_{10-2.5}$

Subpart E procedure	Performance test	Performance specification	Test conditions	Part 50, Appendix L reference
§ 53.52 Sample leak check test	Sampler leak check facility	External leakage: 80 mL/min, max Internal leakage: 80 mL/min, max	Controlled leak flow rate of 80 mL/min	Sec. 7.4.6.
§ 53.53 Base flow rate test	Sample flow rate 1. Mean 2. Regulation 3. Meas accuracy 4. CV accuracy 5. Cut-off	1. 67.67 ±5% L/min 2. 2%, max 3. 2%, max 4. 0.3% max 5. Flow rate cut-off if flow rate deviates more than 10% from design flow rate for >60±30 seconds	(a) 6-hour normal operational test plus flow rate cut-off test (b) Norman conditions (c) Additional 55 mm Hg pressure drop to simulate loaded filter (d) Variable flow restrictions used for cut-off test	Sec. 7.4.1, Sec. 7.4.2, Sec. 7.4.3, Sec. 7.4.4, Sec. 7.4.5.
§ 53.54 Power interruption test	Sample flow rate: 1. Mean 2. Regulation 3. Meas. accuracy 4. CV accuracy 5. Occurrence time of power interruptions 6. Elapsed sample time 7. Sample volume	1. 16.67 ± 5% L/min 2. 2%, max 3. 2%, max 4. 0.3 max 5. ±2 min if >60 seconds 6. ±20 seconds 7. ±2%, max	(a) 6-hour normal operational test (b) Nominal conditions (c) Additional 55 mm Hg pressure drop to simulate loaded filter (d) 6 power interruptions of various durations	Sec. 7.4.1, Sec. 7.4.2, Sec. 7.4.3, Sec. 7.4.5, Sec. 7.4.12, Sec. 7.4.13, Sec. 7.4.15.4, Sec. 7.4.15.5.
§ 53.55 Temperature and line voltage test	Sample flow rate 1. Mean 2. Regulation 3. Meas. accuracy 4. CV accuracy 5. Temperature meas. accuracy 6. Proper operation	1. 16.67 ± 5% L/min 2. 2%, max 3. 2%, max 4. 0.3 max 5 2 °C	(a) 6-hour normal operational test (b) Normal conditions (c) Additional 55 mm Hg pressure drop to simulate loaded filter (d) Ambient temperature at −20 and +40 °C (e) Line voltage: 105 Vac to 125 Vac	Sec. 7.4.1, Sec. 7.4.2, Sec. 7.4.3, Sec. 7.4.5, Sec. 7.4.8, Sec. 7.4.15.1.
§ 53.56 Barometric pressure effect test	Sample flow rate 1. Mean 2. Regulation 3. Meas. accuracy 4. CV accuracy 5. Pressure meas. accuracy 6. Proper operation	1. 16.67 ± 5% L/min 2. 2%, max 3. 2%, max 4. 0.3% max 5. 10 mm Hg	(a) 6-hour normal operational test (b) Normal conditions (c) Additional 55 mm Hg pressure drop to simulate loaded filter (d) Barometer pressure at 600 and 800 mm Hg	Sec. 7.4.1, Sec. 7.4.2, Sec. 7.4.3, Sec. 7.4.5, Sec. 7.4.9.

TABLE E–1 TO SUBPART E.—SUMMARY OF TEST REQUIREMENTS FOR REFERENCE AND CLASS I EQUIVALENT METHODS FOR $PM_{2.5}$ AND $PM_{10\text{-}2.5}$—Continued

Subpart E procedure	Performance test	Performance specification	Test conditions	Part 50, Appendix L reference
§ 53.57 Filter temperature control test	1. Filter temp meas. accuracy 2. Ambient temp. meas. accuracy 3. Filter temp. control accuracy, sampling and non-sampling	1. 2 °C 2. 2 °C 3. Not more than 5 °C above ambient temp. for more than 30 min.	(a) 4-hour simulated solar radiation, sampling (b) 4-hour simulated solar radiation, non-sampling (c) Solar flux of 1000 ±50 W/m^2	Sec. 7.4.8, Sec. 7.4.10, Sec. 7.4.11.
§ 53.58 Field precision test	1 Measurement precision 2. Storage deposition test for sequential samplers	1. P_j <2 $\mu g/m^3$ or RP_j <5% 2. 50 µg max. average weight gain/blank filter	(a) 3 collocated samples at 1 site for at least 10 days; (b) $PM_{2.5}$ conc. > 3 $\mu g/m^3$ (c) 25- or 48-hour samples (d) 5- or 10-day storage period for inactive stored filters	Sec. 5.1, Sec. 7.4.5, Sec. 8, Sec. 9, Sec. 10.
The Following Requirement Is Applicable to Class I Candidate Equivalent Methods Only				
§ 53.59 Aerosol transport test	Aerosol transport	97%, min. for all channels	Determine aerosol transport through any new or modified components with respect to the reference method sampler before the filter for each channel.	

27. References (3) and (5) in appendix A to subpart E of part 53 are revised to read as follows:

Appendix A to Subpart E of Part 53—References

* * * * *

(3) Quality Assurance Guidance Document 2.12. Monitoring $PM_{2.5}$ in Ambient Air Using Designated Reference or Class I Equivalent Methods. U.S. EPA, National Exposure Research Laboratory, Research Triangle Park, NC, November 1998 or later edition. Currently available at *http://www.epa.gov/ttn/amtic/pmgainf.html.*

* * * * *

(5) Quality Assurance Handbook for Air Pollution Measurement Systems, Volume IV: Meteorological Measurements. Revised March, 1995. EPA–600/R–94–038d. Available from National Technical Information Service, Springfield, VA 22161, (800–553–6847, *http://www.ntis.gov*). NTIS number PB95–199782INZ.

* * * * *

Subpart F—[Amended]

28. Section 53.60 is amended by revising paragraphs (b), (c), (d) introductory text, and (f)(4) to read as follows:

§ 53.60 General provisions.

* * * * *

(b) A candidate method described in an application for a reference or equivalent method determination submitted under § 53.4 shall be determined by the EPA to be a Class II candidate equivalent method on the basis of the definition of a Class II equivalent method given in § 53.1.

(c) Any sampler associated with a Class II candidate equivalent method (Class II sampler) must meet all applicable requirements for reference method samplers or Class I equivalent method samplers specified in subpart E of this part, as appropriate. Except as provided in § 53.3(a)(3), a Class II $PM_{2.5}$ sampler must meet the additional requirements as specified in paragraph (d) of this section.

(d) Except as provided in paragraphs (d)(1), (2), and (3) of this section, all Class II samplers are subject to the additional tests and performance requirements specified in § 53.62 (full wind tunnel test), § 53.65 (loading test), and § 53.66 (volatility test). Alternative tests and performance requirements, as described in paragraphs (d)(1), (2), and (3) of this section, are optionally available for certain Class II samplers which meet the requirements for reference method or Class I equivalent method samplers given in 40 CFR part 50, appendix L, and in subpart E of this part, except for specific deviations of the inlet, fractionator, or filter.

* * * * *

(f) * * *

(4) *Loading test.* The loading test is conducted to ensure that the performance of a candidate sampler is not significantly affected by the amount of particulate deposited on its interior surfaces between periodic cleanings. The candidate sampler is artificially loaded by sampling a test environment containing aerosolized, standard test dust. The duration of the loading phase is dependent on both the time between cleaning as specified by the candidate method and the aerosol mass concentration in the test environment. After loading, the candidate's performance must then be evaluated by § 53.62 (full wind tunnel evaluation), § 53.63 (wind tunnel inlet aspiration test), or § 53.64 (static fractionator test). If the results of the appropriate test meet the criteria presented in table F–1 of this subpart, then the candidate sampler passes the loading test under the condition that it be cleaned at least as often as the cleaning frequency proposed by the candidate method and that has been demonstrated to be acceptable by this test.

* * * * *

29. The section heading of § 53.61 is revised to read as follows.

§ 53.61 Test conditions.

* * * * *

30. Section 53.66 is amended by revising paragraph (e)(2)(iii) to read as follows:

§ 53.66 Test procedure: Volatility test.

* * * * *

(e) * * *

(2) * * *

(iii) Operate the candidate and the reference samplers such that they simultaneously sample the test aerosol for 2 hours for a candidate sampler operating at 16.7 L/min or higher, or proportionately longer for a candidate sampler operating at a lower flow rate.

* * * * *

31. Table F–1 to subpart F is revised to read as follows:

TABLE F–1 TO SUBPART F.—PERFORMANCE SPECIFICATIONS FOR $PM_{2.5}$ CLASS II EQUIVALENT SAMPLERS

Performance test	Specifications	Acceptance criteria
§ 53.62 Full Wind Tunnel Evaluation.	Solid VOAG produced aerosol at 2 km/hr and 24 km/hr	Dp_{50} = 2.5 μm ± 0.2 μm Numerical Analysis Results: 95% ≤R_c≤105%.
§ 53.63 Wind Tunnel Inlet Aspiration Test.	Liquid VOAG produced aerosol at 2 km/hr and 24 km/hr.	Relative Aspiration: 95% ≤A≤105%.
§ 53.64 Static Fractionator Test.	Evaluation of the fractionator under static conditions	Dp_{50} = 2.5 μm ± 0.2 μm Numerical Analysis Results: 95% ≤R_c≤105%.
§ 53.65 Loading Test	Loading of the clean candidate under laboratory conditions.	Acceptance criteria as specified in the post-loading evaluation test (§ 53.62, § 53.63, or § 53.64).
§ 53.66 Volatility Test	Polydisperse liquid aerosol producted by air nebulization of A.C.S. reagent grade glycerol, 99.5% minimum purity.	Regression Parameters Slope = 1 ± 0.1, Intercept = 0 ± 0.15 mg r ≥ 0.97.

32. In Figure E–1 to subpart F, the figure number ''E–1'' is revised to read ''F–1.''

PART 58—[AMENDED]

33. The authority citation for part 58 continues to read as follows:

Authority: 42 U.S.C. 7410, 7601(a), 7613, and 7619.

Subpart A—[Amended]

34. Sections 58.1, 58.2 and 58.3 are revised to read as follows:

§ 58.1 Definitions.

As used in this part, all terms not defined herein have the meaning given them in the Act.

Act means the Clean Air Act as amended (42 U.S.C. 7401, *et seq.*)

Additive and multiplicative bias means the linear regression intercept and slope of a linear plot fitted to corresponding candidate and reference method mean measurement data pairs.

Administrator means the Administrator of the Environmental Protection Agency (EPA) or his or her authorized representative.

Air Quality System (AQS) means EPA's computerized system for storing and reporting of information relating to ambient air quality data.

Approved regional method (ARM) means a continuous $PM_{2.5}$ method that has been approved specifically within a State or local air monitoring network for purposes of comparison to the NAAQS and to meet other monitoring objectives.

AQCR means air quality control region.

CO means carbon monoxide.

Combined statistical area (CSA) is defined by the U.S. Office of Management and Budget as a geographical area consisting of two or more adjacent Core Based Statistical Areas (CBSA) with employment interchange of at least 15 percent. Combination is automatic if the employment interchange is 25 percent and determined by local opinion if more than 15 but less than 25 percent (*http://www.census.gov/population/estimates/metro-city/List6.txt*).

Community monitoring zone (CMZ) means an optional averaging area with established, well defined boundaries, such as county or census block, within an MPA that has relatively uniform concentrations of annual $PM_{2.5}$ as defined by appendix N of part 50 of this chapter. Two or more community-oriented SLAMS monitors within a CMZ that meet certain requirements as set forth in appendix N of part 50 of this chapter may be averaged for making comparisons to the annual $PM_{2.5}$ NAAQS.

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 and micropolitan statistical areas (MSA) 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 CBSA are combined, these larger areas are referred to as combined statistical areas (*http://www.census.gov/population/estimates/metro-city/List1.txt*).

Corrected concentration pertains to the result of an accuracy or precision assessment test of an open path analyzer in which a high-concentration test or audit standard gas contained in a short test cell is inserted into the optical measurement beam of the instrument. When the pollutant concentration measured by the analyzer in such a test includes both the pollutant concentration in the test cell and the concentration in the atmosphere, the atmospheric pollutant concentration must be subtracted from the test measurement to obtain the corrected concentration test result. The corrected concentration is equal to the measured concentration minus the average of the atmospheric pollutant concentrations measured (without the test cell) immediately before and immediately after the test.

Design value means the calculated concentration according to the applicable appendix of part 50 of this chapter for the highest site in an attainment or nonattainment area.

EDO means environmental data operations.

Effective concentration pertains to testing an open path analyzer with a high-concentration calibration or audit standard gas contained in a short test cell inserted into the optical measurement beam of the instrument. Effective concentration is the equivalent ambient-level concentration that would produce the same spectral absorbance over the actual atmospheric monitoring path length as produced by the high-concentration gas in the short test cell. Quantitatively, effective concentration is equal to the actual concentration of the gas standard in the test cell multiplied by the ratio of the path length of the test cell to the actual atmospheric monitoring path length.

Equivalent method means a method of sampling and analyzing the ambient air for an air pollutant that has been designated as an equivalent method in accordance with part 53 of this chapter; it does not include a method for which an equivalent method designation has been canceled in accordance with § 53.11 or § 53.16 of this chapter.

HNO_3 means nitric acid.

Local agency means any local government agency, other than the State agency, which is charged by a State with the responsibility for carrying out a portion of the plan.

Meteorological measurements means measurements of wind speed, wind direction, barometric pressure, temperature, relative humidity, solar radiation, ultraviolet radiation, and precipitation.

Metropolitan Statistical Area (MSA) means a CBSA associated with at least one urbanized area of at least 50,000 population. The central county plus adjacent counties with a high degree of integration comprise the area.

Monitor means an instrument, sampler, analyzer, or other device that measures or assists in the measurement of atmospheric air pollutants and which is acceptable for use in ambient air surveillance under the applicable provisions of appendix C to this part.

Monitoring agency means a State or local agency responsible for meeting the requirements of this part.

Monitoring organization means a State, local, or other monitoring organization responsible for operating a monitoring site for which the quality assurance regulations apply.

Monitoring path for an open path analyzer means the actual path in space between two geographical locations over which the pollutant concentration is measured and averaged.

Monitoring path length of an open path analyzer means the length of the monitoring path in the atmosphere over which the average pollutant concentration measurement (path-averaged concentration) is determined. See also, *optical measurement path length*.

Monitoring planning area (MPA) means a contiguous geographic area with established, well defined boundaries, such as a CBSA, county or State, having a common area that is used for planning monitoring locations for $PM_{2.5}$. An MPA may cross State boundaries, such as the Philadelphia PA-NJ MSA, and be further subdivided into community monitoring zones. MPA are generally oriented toward CBSA or CSA with populations greater than 200,000, but for convenience, those portions of a State that are not associated with CBSA can be considered as a single MPA.

NATTS means the national air toxics trends stations. This network provides hazardous air pollution ambient data.

NCore means the National Core multipollutant monitoring stations. Monitors at these sites are required to measure particles ($PM_{2.5}$, speciated $PM_{2.5}$, $PM_{10\text{-}2.5}$), O_3, SO_2, CO, nitrogen oxides ($NO/NO_2/NO_Y$), and basic meteorology.

Network means all stations of a given type or types.

NH_3 means ammonia.

NO_2 means nitrogen dioxide. NO means nitrogen oxide. NO_X means oxides of nitrogen and is defined as the sum of the concentrations of NO_2 and NO.

NO_y means the sum of all total reactive nitrogen oxides, including NO, NO_2, and other nitrogen oxides referred to as NO_Z.

O_3 means ozone.

Open path analyzer means an automated analytical method that measures the average atmospheric pollutant concentration in situ along one or more monitoring paths having a monitoring path length of 5 meters or more and that has been designated as a reference or equivalent method under the provisions of part 53 of this chapter.

Optical measurement path length means the actual length of the optical beam over which measurement of the pollutant is determined. The path-integrated pollutant concentration measured by the analyzer is divided by the optical measurement path length to determine the path-averaged concentration. Generally, the optical measurement path length is:

(1) Equal to the monitoring path length for a (bistatic) system having a transmitter and a receiver at opposite ends of the monitoring path;

(2) Equal to twice the monitoring path length for a (monostatic) system having a transmitter and receiver at one end of the monitoring path and a mirror or retroreflector at the other end; or

(3) Equal to some multiple of the monitoring path length for more complex systems having multiple passes of the measurement beam through the monitoring path.

PAMS means photochemical assessment monitoring stations.

Pb means lead.

Plan means a implementation plan approved or promulgated pursuant to section 110 of the Act.

$PM_{2.5}$ means particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers as measured by a reference method based on appendix L of part 50 of this chapter and designated in accordance with part 53 of this chapter, by an equivalent method designated in accordance with part 53 of this chapter, or by an approved regional method designated in accordance with appendix C to this part.

PM_{10} means particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers as measured by a reference method based on appendix J of part 50 of this chapter and designated in accordance with part 53 of this chapter or by an equivalent method designated in accordance with part 53 of this chapter.

PM_{10C} means particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers as measured by a reference method based on appendix O of part 50 of this chapter and designated in accordance with part 53 of this chapter or by an equivalent method designated in accordance with part 53 of this chapter.

$PM_{10\text{-}2.5}$ means particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers and greater than a nominal 2.5 micrometers as measured by a reference method based on appendix O to part 50 of this chapter and designated in accordance with part 53 of this chapter or by an equivalent method designated in accordance with part 53 of this chapter.

Point analyzer means an automated analytical method that measures pollutant concentration in an ambient air sample extracted from the atmosphere at a specific inlet probe point and that has been designated as a reference or equivalent method in accordance with part 53 of this chapter.

Population-oriented monitoring (or sites) means residential areas, commercial areas, recreational areas, industrial areas where workers from more than one company are located, and other areas where a substantial number of people may spend a significant fraction of their day.

Primary quality assurance organization means a monitoring organization or other organization that is responsible for a set of stations that monitors the same pollutant and for which data quality assessments can be pooled. Each criteria pollutant sampler/monitor at a monitoring station in the SLAMS and SPM networks must be associated with one, and only one, primary quality assurance organization.

Probe means the actual inlet where an air sample is extracted from the atmosphere for delivery to a sampler or point analyzer for pollutant analysis.

PSD station means any station operated for the purpose of establishing the effect on air quality of the emissions from a proposed source for purposes of prevention of significant deterioration as required by § 51.24(n) of this chapter.

Reference method means a method of sampling and analyzing the ambient air for an air pollutant that is specified as a reference method in an appendix to part 50 of this chapter, or a method that has been designated as a reference method in accordance with this part; it does not include a method for which a reference method designation has been canceled in accordance with § 53.11 or § 53.16 of this chapter.

Regional Administrator means the Administrator of one of the ten EPA Regional Offices or his or her authorized representative.

Reporting organization means an entity, such as a State, local, or Tribal monitoring agency, that collects and reports air quality data to EPA.

Site means a geographic location. One or more stations may be at the same site.

SLAMS means State or local air monitoring stations. The SLAMS make up the ambient air quality monitoring sites that are primarily needed for NAAQS comparisons, but may serve other data purposes. SLAMS exclude special purpose monitor (SPM) stations and include NCore, PAMS, and all other State or locally operated stations that have not been designated as SPM stations.

SO_2 means sulfur dioxide.

Special purpose monitor (SPM) station means a monitor included in an agency's monitoring network that the agency has designated as a special purpose monitor station in its monitoring network plan and in the Air Quality System, and which the agency does not count when showing compliance with the minimum requirements of this subpart for the number and siting of monitors of various types.

State agency means the air pollution control agency primarily responsible for development and implementation of a plan under the Act.

State speciation site means a supplemental $PM_{2.5}$ speciation station that is not part of the speciation trends network.

Station means a single monitor, or a group of monitors with a shared objective, located at a particular site.

STN station means a $PM_{2.5}$ speciation station designated to be part of the speciation trends network. This network provides chemical species data of fine particulate.

Traceable means that a local standard has been compared and certified, either directly or via not more than one intermediate standard, to a National Institute of Standards and Technology (NIST)-certified primary standard such as a NIST-traceable Reference Material (NTRM) or a NIST-certified Gas Manufacturer's Internal Standard (GMIS).

TSP (total suspended particulates) means particulate matter as measured by the method described in appendix B of part 50 of this chapter.

Urbanized area means an area with a minimum residential population of at least 50,000 people and which generally includes core census block groups or blocks that have a population density of at least 1,000 people per square mile and surrounding census blocks that have an overall density of at least 500 people per square mile. The Census Bureau notes that under certain conditions, less densely settled territory may be part of each Urbanized Area.

VOC means volatile organic compounds.

§ 58.2 Purpose.

(a) This part contains requirements for measuring ambient air quality and for reporting ambient air quality data and related information. The monitoring criteria pertain to the following areas:

(1) Quality assurance procedures for monitor operation and data handling.

(2) Methodology used in monitoring stations.

(3) Operating schedule.

(4) Siting parameters for instruments or instrument probes.

(5) Minimum ambient air quality monitoring network requirements used to provide support to the State implementation plans (SIP), national air quality assessments, and policy decisions. These minimums are described as part of the network design requirements, including minimum numbers and placement of monitors of each type.

(6) Air quality data reporting, and requirements for the daily reporting of an index of ambient air quality.

(b) The requirements pertaining to provisions for an air quality surveillance system in the SIP are contained in this part.

(c) This part also acts to establish a national ambient air quality monitoring network for the purpose of providing timely air quality data upon which to base national assessments and policy decisions.

§ 58.3 Applicability

This part applies to:

(a) State air pollution control agencies.

(b) Any local air pollution control agency to which the State has delegated authority to operate a portion of the State's SLAMS network.

(c) Owners or operators of proposed sources.

Subpart B—Monitoring Network

35. The heading for subpart B is revised as set forth above.

36. Sections 58.10 through 58.14 are revised and §§ 58.15 and 58.16 are added to read as follows:

§ 58.10 Annual monitoring network plan and periodic network assessment.

(a)(1) Beginning July 1, 2007, the State, or where applicable local, agency shall adopt and submit to the Regional Administrator an annual monitoring network plan which shall provide for the establishment and maintenance of an air quality surveillance system that consists of a network of monitoring stations including Federal reference method (FRM), Federal equivalent method (FEM), and approved regional method (ARM) monitors that are part of SLAMS, NCore stations, STN stations, State speciation stations, SPM stations, and/or, in serious, severe and extreme ozone nonattainment areas, PAMS stations. The plan shall include a statement of purpose for each monitor and evidence that siting and operation of each monitor meets the requirements of appendices A, C, D, and E of this part, where applicable. The annual monitoring network plan must be made available for public inspection for at least 30 days prior to submission to EPA.

(2) Any annual monitoring network plan that proposes SLAMS network modifications including new monitoring sites is subject to the approval of the EPA Regional Administrator, who shall provide opportunity for public comment and shall approve or disapprove the plan and schedule within 120 days.

(3) $PM_{10-2.5}$ stations.

(i) The plan for establishing a network of $PM_{10-2.5}$ stations is due not later than January 1, 2008, as an addendum to the annual monitoring network plan required to be submitted July 1, 2007, unless the Regional Administrator extends this due date to July 1, 2008, in which case it shall be part of the annual monitoring network plan due by that date.

(ii) The plan shall provide for required $PM_{10-2.5}$ stations to be operational by January 1, 2009.

(iii) The plan shall identify whether each planned $PM_{10-2.5}$ station is suitable for comparison with the $PM_{10-2.5}$ NAAQS under the criteria of § 58.30(b), and shall include evidence for that identification including the information obtained and conclusions reached in each site-specific assessment.

(iv) Identification of existing and proposed sites as suitable for comparison against the 24-hour $PM_{10-2.5}$

NAAQS are subject to approval by the EPA Regional Administrator as part of the approval of the plan for the $PM_{10-2.5}$ monitoring network. Such approval will constitute a final action by EPA.

(4) The plan for establishing required NCore multipollutant stations is due July 1, 2009. The plan shall provide for all required stations to be operational by January 1, 2011.

(b) The annual monitoring network plan must contain cost information for the network and the following information for each existing and proposed site:

(1) The AQS site identification number.

(2) The location, including street address and geographical coordinates.

(3) The sampling and analysis method(s) for each measured parameter.

(4) The operating schedules for each monitor.

(5) Any proposals to remove or move a monitoring station within a period of 18 months following plan submittal.

(6) The monitoring objective and spatial scale of representativeness for each monitor as defined in appendix D to this part.

(7) The identification of any sites that are suitable and sites that are not suitable for comparison against the annual $PM_{2.5}$ NAAQS or 24-hour $PM_{10-2.5}$ NAAQS as described in § 58.30.

(8) Information supporting the basis for determining that $PM_{10-2.5}$ sites are either suitable or not suitable for comparison to the 24-hour $PM_{10-2.5}$ NAAQS as described in § 58.30(b).

(9) The MSA, CBSA, CSA or other area represented by the monitor.

(c) The annual monitoring network plan must consider the ability of existing and proposed sites to support air quality characterization for areas with relatively high populations of susceptible individuals (e.g., children with asthma), and, for any sites that are being proposed for discontinuance, the effect on data users other than the agency itself, such as nearby States and Tribes or health effects studies.

(d) The annual monitoring network plan must document how States and local agencies provide for the review of changes to a $PM_{2.5}$ monitoring network that impact the location of a violating $PM_{2.5}$ monitor or the creation/change to a community monitoring zone, including a description of the proposed use of spatial averaging for purposes of making comparisons to the annual $PM_{2.5}$ NAAQS as set forth in appendix N to part 50 of this chapter. The affected State or local agency must document the process for providing public hearings and include any comments received through the public notification process within their submitted plan.

(e) The State, or where applicable local, agency shall perform and submit to the EPA Regional Administrator an assessment of the air quality surveillance system every 5 years to determine, at a minimum, if the network meets the monitoring objectives defined in appendix D to this part, whether new sites are needed, whether existing sites are no longer needed and can be terminated, and whether new technologies are appropriate for incorporation into the ambient air monitoring network. For $PM_{2.5}$, the assessment also must identify needed changes to population-oriented sites. The State, or where applicable local, agency must submit a copy of this 5-year assessment, along with a revised annual network plan, to the Regional Administrator. The first assessment is due July 1, 2009. For $PM_{10-2.5}$, each assessment due on or after July 1, 2014 must identify needed changes to the identification of whether each site is suitable or unsuitable for comparison to the NAAQS under the criteria of § 58.30(b), based on changes in emissions sources affecting the site or better information about these sources.

(f) All proposed additions and discontinuations of monitors in annual monitoring network plans and periodic network assessments are subject to approval according to § 58.14.

§ 58.11 Network technical requirements.

(a) State and local governments shall follow the applicable quality assurance criteria contained in appendix A to this part when operating the SLAMS and SPM networks. The owner or operator of an existing or a proposed source shall follow the quality assurance criteria in appendix A to this part that apply to PSD monitoring when operating a PSD site.

(b) State and local governments must follow the criteria in appendix C to this part to determine acceptable monitoring methods or instruments for use in SLAMS networks. Appendix C criteria are optional at SPM stations.

(c) State and local governments must follow the network design criteria contained in appendix D to this part in designing and maintaining the SLAMS stations. The final network design and all changes in design are subject to approval of the Regional Administrator. NCore, STN, and PAMS network design and changes are also subject to approval of the Administrator. Changes in SPM stations do not require approvals, but a change in the designation of a monitoring site from SLAMS to SPM requires approval of the Regional Administrator.

(d) State and local governments must follow the criteria contained in appendix E to this part for siting monitor inlets, paths or probes at SLAMS stations. Appendix E adherence is optional for SPM stations that do not use appendix C methods.

§ 58.12 Operating schedules.

State and local governments shall collect ambient air quality data at any SLAMS station on the following operational schedules:

(a) For continuous analyzers, consecutive hourly averages must be collected except during:

(1) Periods of routine maintenance,

(2) Periods of instrument calibration, or

(3) Periods or monitoring seasons exempted by the Regional Administrator.

(b) For Pb and PM_{10} manual methods, at least one 24-hour sample must be collected every 6 days except during periods or seasons exempted by the Regional Administrator.

(c) For PAMS VOC samplers, samples must be collected as specified in section 5 of appendix D to this part. Area-specific PAMS operating schedules must be included as part of the PAMS network description and must be approved by the Regional Administrator.

(d) For manual $PM_{2.5}$ samplers:

(1) Manual $PM_{2.5}$ samplers at other SLAMS stations must operate on at least a 1-in-3 day schedule at sites without a collocated continuously operating $PM_{2.5}$ monitor. For SLAMS $PM_{2.5}$ sites with both manual and continuous $PM_{2.5}$ monitors operating, the $PM_{2.5}$ manual sampler may be operated with a 1-in-6 day sampling frequency under certain conditions. A monitoring agency may request approval for a reduction to 1-in-6 day $PM_{2.5}$ sampling at SLAMS stations or for seasonal sampling from the EPA Regional Administrator. The EPA Regional Administrator may grant sampling frequency reductions after consideration of the historical $PM_{2.5}$ data quality assessments, the location of current $PM_{2.5}$ design value sites, and their regulatory data needs. Sites that have design values that are within ±10 percent of the NAAQS; and sites where the 24-hour values exceed the NAAQS for a period of 3 years are required to maintain at least a 1-in-3 day sampling frequency.

(2) Manual $PM_{2.5}$ samplers at NCore stations and required regional background and regional transport sites must operate on at least a 1-in-3 day sampling frequency.

(3) Manual $PM_{2.5}$ speciation samplers at STN stations must operate on a 1-in-3 day sampling frequency.

(e) Manual $PM_{10-2.5}$ samplers at SLAMS stations must operate on a daily schedule at sites without a collocated continuously operating equivalent $PM_{10-2.5}$ method that has been designated in accordance with part 53 of this chapter.

§ 58.13 Monitoring network completion.

(a) The network of $PM_{10-2.5}$ sites must be physically established no later than January 1, 2009, and at that time, operating under all of the requirements of this part, including the requirements of appendices A, C, D, E, and G to this part.

(b) The network of NCore multipollutant sites must be physically established no later than January 1, 2011, and at that time, operating under all of the requirements of this part, including the requirements of appendices A, C, D, E, and G to this part.

§ 58.14 System modification.

(a) The State, or where appropriate local, agency shall develop and implement a plan and schedule to modify the ambient air quality monitoring network that complies with the findings of the network assessments required every 5 years by § 58.10(e). The State or local agency shall consult with the EPA Regional Administrator during the development of the schedule to modify the monitoring program, and shall make the plan and schedule available to the public for 30 days prior to submission to the EPA Regional Administrator. The final plan and schedule are subject to the approval of the EPA Regional Administrator, who shall provide opportunity for public comment and shall approve or disapprove the plan and schedule within 120 days.

(b) Nothing in this section shall preclude the State, or where appropriate local, agency from making modifications to the SLAMS network for reasons other than those resulting from the periodic network assessments. These modifications must be reviewed and approved by the Regional Administrator. Each monitoring network may make or be required to make changes between the 5-year assessment periods, including for example, site relocations or the addition of PAMS networks in bumped-up ozone nonattainment areas. These modifications must address changes invoked by a new census and changes due to changing air quality levels. The State, or where appropriate local, agency shall provide written communication describing the network changes to the Regional Administrator for review and approval as these changes are identified.

(c) State, or where appropriate, local agency requests for monitor station discontinuation, subject to the review of the Regional Administrator, will be approved if any of the following criteria are met. Other requests for discontinuation may also be approved on a case by case basis if discontinuance does not compromise data collection needed for implementation of a NAAQS.

(1) Any $PM_{2.5}$, O_3, CO, PM_{10}, SO_2, Pb, or NO_2 monitor which has shown attainment during the previous five years, that has a probability of less than 10 percent of exceeding 80 percent of the applicable NAAQS during the next three years based on the levels, trends, and variability observed in the past, and which is not specifically required by an attainment plan or maintenance plan.

(2) Any monitor for CO, PM_{10}, SO_2, or NO_2 which has consistently measured lower concentrations than another monitor for the same pollutant in the same county and same nonattainment area during the previous five years, and which is not specifically required by an attainment plan or maintenance plan, if control measures scheduled to be implemented or discontinued during the next five years would apply to the areas around both monitors and have similar effects on measured concentrations, such that the retained monitor would remain the higher reading of the two monitors being compared.

(3) For any pollutant, the highest reading monitor (which may be the only monitor) in a county (or portion of a county within a distinct nonattainment or maintenance area) provided the monitor has not measured violations of the applicable NAAQS in the previous five years, the MSA or CSA within which the county lies (if in any) would still meet requirements for the minimum number of monitors for the applicable pollutant if any, and the approved SIP provides for a specific, reproducible approach to representing the air quality of the affected county in the absence of actual monitoring data.

(4) A monitor which EPA has determined cannot be compared to the relevant NAAQS because of the siting of the monitor, in accordance with § 58.30.

(5) A monitor that is designed to measure concentrations upwind of an urban area for purposes of characterizing transport into the area and that has not recorded violations of the relevant NAAQS in the previous five years, if discontinuation of the monitor is tied to start-up of another station also characterizing transport.

§ 58.15 Annual air monitoring data certification.

(a) Beginning May 1, 2009, the State, or where appropriate local, agency shall submit to the EPA Regional Administrator an annual air monitoring data certification letter to certify data collected at all SLAMS and at all SPM stations that meet appendix C and appendix E criteria from January 1 to December 31 of the previous year. The senior air pollution control officer in each agency, or their designee, shall certify that the previous year of ambient concentration and quality assurance data are completely submitted to AQS and that the ambient concentration data are accurate to the best of her or his knowledge, taking into consideration the quality assurance findings.

(b) Along with each certification letter, the State shall submit to the Administrator (through the appropriate Regional Office) an annual summary report of all the ambient air quality data from all monitoring stations designated as SLAMS. The State also shall submit an annual summary to the appropriate Regional Administrator of all the ambient air quality monitoring data from all FRM, FEM, and ARM at SPM stations that are described in the State's current monitoring network description. The annual report(s) shall be submitted for data collected from January 1 to December 31 of the previous year. The annual summary report(s) must contain all information and data required by the State's approved plan and be submitted by July 1 of each year, unless an approved alternative date is included in the plan. The annual summary serves as the record of the specific data that is the object of the certification letter.

§ 58.16 Data submittal.

(a) The State, or where appropriate, local agency, shall report to the Administrator, via AQS all ambient air quality data and associated quality assurance data for SO_2, CO, O_3, NO_2, NO, NO_Y, Pb, PM_{10}, $PM_{2.5}$ mass concentration, for filter-based $PM_{2.5}$ FRM/FEM (field blank mass, sampler-generated average daily temperature, sampler-generated average daily pressure), chemically speciated $PM_{2.5}$ mass concentration data, $PM_{10-2.5}$ (mass concentration and chemically speciated data), meteorological data from NCore and PAMS sites, and metadata records and information specified by the AQS Data Coding Manual (*http://www.epa.gov/ttn/airs/airsaqs/manuals/manuals.htm*). Such air quality data and information must be submitted directly to the AQS via electronic transmission on the specified quarterly schedule described in paragraph (b) of this section.

(b) The specific quarterly reporting periods are January 1–March 31, April 1–June 30, July 1–September 30, and October 1–December 31. The data and information reported for each reporting period must contain all data and information gathered during the reporting period, and be received in the AQS within 90 days after the end of the quarterly reporting period. For example, the data for the reporting period January 1–March 31 are due on or before June 30 of that year.

(c) Air quality data submitted for each reporting period must be edited, validated, and entered into the AQS (within the time limits specified in paragraph (b) of this section) pursuant to appropriate AQS procedures. The procedures for editing and validating data are described in the AQS Data Coding Manual and in each monitoring agency's quality assurance project plan.

(d) The State shall report VOC and if collected, carbonyl, NH_3, and HNO_3 data, from PAMS sites to AQS within 6 months following the end of each quarterly reporting period listed in paragraph (b) of this section.

(e) The State shall also submit any portion or all of the SLAMS and SPM data to the appropriate Regional Administrator upon request.

Subpart C—Special Purpose Monitors

37. The heading for subpart C is revised as set forth above.

38. Section 58.20 is revised to read as follows:

§ 58.20 Special purpose monitors (SPM).

(a) An SPM is defined as any monitor included in an agency's monitoring network that the agency has designated as a special purpose monitor in its annual monitoring network plan and in AQS, and which the agency does not count when showing compliance with the minimum requirements of this subpart for the number and siting of monitors of various types. Any SPM operated by an air monitoring agency must be included in the periodic assessments and annual monitoring network plan required by § 58.10. The plan shall include a statement of purpose for each SPM monitor and a evidence that siting and operation of each monitor meets the requirements of appendix A where applicable. The monitoring agency may designate a monitor as an SPM after January 1, 2007 only if it is a new monitor not previously included in the monitoring plan.

(b) Any SPM data collected by an air monitoring agency using a Federal reference method (FRM), Federal equivalent method (FEM), or approved regional method (ARM) must meet the requirements of § 58.11, § 58.12, and appendices A and C to this part. Compliance with appendix E to this part is optional but encouraged except when the monitoring agency's data objectives are inconsistent with those requirements. Data collected at an SPM meeting these requirements must be submitted to AQS according to the requirements of § 58.16. The monitoring agency must also submit to AQS an indication of whether the monitor meets the requirements of appendix E to this part.

(c) All data from an SPM using an FRM, FEM, or ARM which has operated for more than 24 months is eligible for comparison to the relevant NAAQS, subject to the conditions of § 58.30, unless the air monitoring agency demonstrates in the documentation required in paragraph (a) of this section that the data from a particular period does not meet the requirements in paragraph (b) of this section.

(d) If an SPM using an FRM, FEM, or ARM is discontinued within 24 months of start-up, the Administrator will not use data from the SPM for NAAQS violation determinations for the $PM_{2.5}$, $PM_{10-2.5}$, ozone, or the annual PM_{10} NAAQS.

(e) If an SPM using an FRM, FEM, or ARM is discontinued within 24 months of start-up, the Administrator will not use data from the SPM for NAAQS violation determinations for purposes of designating an area as nonattainment, for the CO, SO_2, NO_2, Pb, or 24-hour PM_{10} NAAQS. Such data are eligible for use in determinations of whether a nonattainment area has attained one of these NAAQS.

(f) Prior approval from EPA is not required for discontinuance of an SPM.

39. Sections 58.21 through 58.28 are removed.

Subpart D—Comparability of Ambient Data to NAAQS

40. The heading for subpart D is revised as set forth above.

41. Section 58.30 is revised to read as follows:

§ 58.30 Special considerations for data comparisons to the NAAQS.

(a) *Comparability of $PM_{2.5}$* data. (1) There are two forms of the $PM_{2.5}$ NAAQS described in part 50 of this chapter. The $PM_{2.5}$ monitoring site characteristics (see appendix D, section 4.7.1) impact how the resulting $PM_{2.5}$ data can be compared to the annual $PM_{2.5}$ NAAQS form. $PM_{2.5}$ data that are representative, not of areawide but rather, of relatively unique population-oriented microscale, or localized hot spot, or unique population-oriented middle-scale impact sites are only eligible for comparison to the 24-hour $PM_{2.5}$ NAAQS. For example, if the $PM_{2.5}$ monitoring site is adjacent to a unique dominating local $PM_{2.5}$ source or can be shown to have average 24-hour concentrations representative of a smaller than neighborhood spatial scale, then data from a monitor at the site would only be eligible for comparison to the 24-hour $PM_{2.5}$ NAAQS.

(2) There are cases where certain population-oriented, microscale or middle scale $PM_{2.5}$ monitoring sites are determined by the Regional Administrator to collectively identify a larger region of localized high ambient $PM_{2.5}$ concentrations. In those cases, data from these population-oriented sites would be eligible for comparison to the annual $PM_{2.5}$ NAAQS.

(b) *Comparability of $PM_{10-2.5}$ data.* To be eligible (or suitable) for comparison to the $PM_{10-2.5}$ NAAQS, $PM_{10-2.5}$ data must be from a monitoring site that meets all five of the following conditions.

(1) The site must be within the boundaries of an urbanized area as defined by the U.S. Bureau of the Census which has a population of at least 100,000 persons.

(2) The site must be in a census block group with a population density of 500 or more persons per square mile. Alternatively, the site may be in a census block group with a lower population density if the block group is part of an enclave that is not more than five square miles in land area.

(3) The site must be population-oriented.

(4) The site may not be in source-influenced microenvironments (such as a microscale or localized hot spot site) not eligible for comparison to the annual $PM_{2.5}$ NAAQS under the conditions of paragraph (a) of this section. For example, if the $PM_{10-2.5}$ monitoring site is located on the fenceline of a dominating local $PM_{10-2.5}$ source, then data from a monitor at the site would not be eligible for comparison to the 24-hour $PM_{10-2.5}$ NAAQS.

(5) $PM_{10-2.5}$ concentrations at the site must be dominated by resuspended dust from high-density traffic on paved roads and PM generated by industrial sources and construction sources, and must not be dominated by rural windblown dust and soils and PM generated by

agricultural and mining sources, as determined by the State (and approved by the Regional Administrator) in a site-specific assessment. The site-specific assessment shall consider the types and sizes of sources that may impact the site, the impact of meteorological conditions on site-source relationships, verification that the site is not exposed to windblown rural dust and soil or emissions from agriculture and mining to such an extent that those sources would dominate the mix of $PM_{10-2.5}$ sampled at that site, and other factors necessary for completing the assessment.

42. Sections 58.31 through 58.36 are removed.

Subpart E—[Removed and Reserved]

43. Subpart E of part 58 is removed and reserved.

Subpart F—[Amended]

44. Section 58.50 is revised to read as follows:

§ 58.50 Index reporting.

(a) The State or where applicable, local agency shall report to the general public on a daily basis through prominent notice an air quality index that complies with the requirements of appendix G to this part.

(b) Reporting is required for all individual MSA with a population exceeding 350,000.

(c) The population of a MSA for purposes of index reporting is the most recent decennial U.S. census population.

Subpart G—[Amended]

45. Sections 58.60 and 58.61 are revised to read as follows:

§ 58.60 Federal monitoring.

The Administrator may locate and operate an ambient air monitoring site if the State or local agency fails to locate, or schedule to be located, during the initial network design process, or as a result of the 5-year network assessments required within § 58.10, a SLAMS station at a site which is necessary in the judgement of the Regional Administrator to meet the objectives defined in appendix D to this part.

§ 58.61 Monitoring other pollutants.

The Administrator may promulgate criteria similar to that referenced in subpart B of this part for monitoring a pollutant for which an NAAQS does not exist. Such an action would be taken whenever the Administrator determines that a nationwide monitoring program is necessary to monitor such a pollutant.

49. Appendix A to part 58 is revised to read as follows:

Appendix A to Part 58—Quality Assurance Requirements for SLAMS, NCore, and PSD Air Monitoring

1. General Information.
2. Quality System Requirements.
3. Measurement Quality Check Requirements.
4. Calculations for Data Quality Assessments.
5. Reporting Requirements.
6. References.

1. *General Information.*

This appendix specifies the minimum quality system requirements applicable to SLAMS air monitoring data and PSD data submitted to EPA. In this section, NCore stations and SPM stations (using FRM, FEM, or ARM methods) are considered a subset of the SLAMS network. Monitoring organizations are encouraged to develop and maintain quality systems more extensive than the required minimums. The permit-granting authority for PSD may require more frequent or more stringent requirements. Monitoring organizations may, based on their quality objectives, be required to develop and maintain quality systems beyond the required minimum. Additional guidance for the requirements reflected in this appendix can be found in the ''Quality Assurance Handbook for Air Pollution Measurement Systems'', volume II, part 1 (see reference 10 of this appendix) and at a national level in references 1, 2, and 3 of this appendix.

1.1 Similarities and Differences Between SLAMS and PSD Monitoring. In most cases, the quality assurance requirements for SLAMS and PSD are the same. Table A–1 of this appendix summarizes the major similarities and differences of the requirements for SLAMS and PSD. Both programs require:

(a) The development, documentation, and implementation of an approved quality system;

(b) The assessment of data quality;

(c) The use of reference, equivalent, or approved methods (optional for SPM);

(d) The use of calibration standards traceable to NIST or other primary standard;

(e) Performance evaluations and systems.

1.1.1 The monitoring and quality assurance responsibilities for SLAMS are with the State or local agency, hereafter called the monitoring organization, whereas for PSD they are with the owner/operator seeking the permit. The monitoring duration for SLAMS is indefinite, whereas for PSD the duration is usually 12 months. Whereas the reporting period for precision and accuracy data is on an annual or calendar quarter basis for SLAMS, it is on a continuing sampler quarter basis for PSD—since the monitoring may not commence at the beginning of a calendar quarter.

1.1.2 The performance evaluations for PSD must be conducted by personnel different from those who perform routine span checks and calibrations, whereas for SLAMS, it is the preferred but not the required condition. For PSD, the evaluation rate is 100 percent of the sites per reporting quarter whereas for SLAMS it is 25 percent of the sites or instruments quarterly. Note that monitoring for sulfur dioxide (SO_2) and nitrogen dioxide (NO_2) for PSD must be done with automated analyzers—the manual bubbler methods are not permitted.

1.1.3 The requirements for precision assessment for the automated methods are the same for both SLAMS and PSD. However, for manual methods, only one collocated site is required for PSD.

1.1.4 The precision, accuracy and bias data for PSD are reported separately for each sampler (site), whereas for SLAMS, the report may be by sampler (site) or primary quality assurance organization, depending on the pollutant. SLAMS data are required to be reported to the AQS, PSD data are required to be reported to the permit-granting authority. Requirements in this appendix, with the exception to the differences discussed in this section, and in Table A–1 of this appendix will be expected to be followed by both SLAMS and PSD networks unless directly specified in a particular section.

1.2 Measurement Uncertainty. Measurement uncertainty is a term used to describe deviations from a true concentration or estimate that are related to the measurement process and not to spatial or temporal population attributes of the air being measured. Monitoring organizations must develop quality assurance project plans (QAPP) which describe how the organization intends to control measurement uncertainty to an appropriate level in order to achieve the data quality objectives. Data quality indicators associated with measurement uncertainty include:

(a) Precision. A measurement of mutual agreement among individual measurements of the same property usually under prescribed similar conditions, expressed generally in terms of the standard deviation.

(b) Bias. The systematic or persistent distortion of a measurement process which causes errors in one direction.

(c) Accuracy. The degree of agreement between an observed value and an accepted reference value. Accuracy includes a combination of random error (imprecision) and systematic error (bias) components which are due to sampling and analytical operations.

(d) Completeness. A measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under correct, normal conditions.

(e) Detectability. The low critical range value of a characteristic that a method specific procedure can reliably discern.

1.3 Measurement Quality Checks. The SLAMS measurement quality checks described in sections 3.2 and 3.3 of this appendix shall be reported to AQS and are included in the data required for certification. The PSD network is required to implement the measurement quality checks and submit this information quarterly along with assessment information to the permit-granting authority.

1.4 Assessments and Reports. Periodic assessments and documentation of data quality are required to be reported to EPA or to the permit granting authority (PSD). To provide national uniformity in this assessment and reporting of data quality for all networks, specific assessment and reporting procedures are prescribed in detail in sections 3, 4, and 5 of this appendix. On the other hand, the selection and extent of the quality assurance and quality control activities used by a monitoring organization depend on a number of local factors such as field and laboratory conditions, the objectives for monitoring, the level of data quality needed, the expertise of assigned personnel, the cost of control procedures, pollutant concentration levels, etc. Therefore, quality system requirements in section 2 of this appendix are specified in general terms to allow each monitoring organization to develop a quality system that is most efficient and effective for its own circumstances while achieving the data quality objectives required for the SLAMS sites.

2. *Quality System Requirements.*

A quality system is the means by which an organization manages the quality of the monitoring information it produces in a systematic, organized manner. It provides a framework for planning, implementing, assessing and reporting work performed by an organization and for carrying out required quality assurance and quality control activities.

2.1 Quality Management Plans and Quality Assurance Project Plans. All monitoring organizations must develop a quality system that is described and approved in quality management plans (QMP) and quality assurance project plans (QAPP) to ensure that the monitoring results:

(a) Meet a well-defined need, use, or purpose;

(b) Provide data of adequate quality for the intended monitoring objectives;

(c) Satisfy stakeholder expectations;

(d) Comply with applicable standards specifications;

(e) Comply with statutory (and other) requirements of society; and

(f) Reflect consideration of cost and economics.

2.1.1 The QMP describes the quality system in terms of the organizational structure, functional responsibilities of management and staff, lines of authority, and required interfaces for those planning, implementing, assessing and reporting activities involving environmental data operations (EDO). The QMP must be suitably documented in accordance with EPA requirements (reference 2 of this appendix), and approved by the appropriate Regional Administrator, or Regional Administrator's designee. The quality system will be reviewed during the systems audits described in section 2.5 of this appendix. Organizations that implement long-term monitoring programs with EPA funds should have a separate QMP document. Smaller organizations or organizations that do infrequent work with EPA funds may combine the QMP with the QAPP based on negotiations with the funding agency. Additional guidance on this process can be found in reference 10 of this appendix. Approval of the recipient's QMP by the appropriate Regional Administrator, or the Regional Administrator's designee, may allow delegation of the authority to review and approve QAPP to the recipient, based on adequacy of quality assurance procedures described and documented in the QMP. The QAPP will be reviewed by EPA during systems audits or circumstances related to data quality.

2.1.2 The QAPP is a formal document describing, in sufficient detail, the quality system that must be implemented to ensure that the results of work performed will satisfy the stated objectives. The quality assurance policy of the EPA requires every EDO to have written and approved QAPP prior to the start of the EDO. It is the responsibility of the monitoring organization to adhere to this policy. The QAPP must be suitably documented in accordance with EPA requirements (reference 3 of this appendix).

2.1.3 The monitoring organizations' quality system must have adequate resources both in personnel and funding to plan, implement, assess and report on the achievement of the requirements of this appendix and its approved QAPP.

2.2 Independence of Quality Assurance. The monitoring organization must provide for a quality assurance management function; that aspect of the overall management system of the organization that determines and implements the quality policy defined in a monitoring organization's QMP. Quality management includes strategic planning, allocation of resources and other systematic planning activities (e.g. planning, implementation, assessing and reporting) pertaining to the quality system. The quality assurance management function must have sufficient technical expertise and management authority to conduct independent oversight and assure the implementation of the organization's quality system relative to the Ambient Air Quality Monitoring Program and should be organizationally independent of environmental data generation activities.

2.3 Data Quality Performance Requirements.

2.3.1 Data Quality Objectives. Data quality objectives (DQO) or the results of other systematic planning processes are statements that define the appropriate type of data to collect and specify the tolerable levels of potential decision errors that will be used as a basis for establishing the quality and quantity of data needed to support the objectives of the SLAMS stations. DQO will be developed by EPA to support the primary SLAMS objectives for each criteria pollutant. As they are developed they will be added to the regulation. DQO or the results of other systematic planning processes for PSD or other monitoring will be the responsibility of the monitoring organizations. The quality of the conclusions made from data interpretation can be affected by population uncertainty (spatial or temporal uncertainty) and measurement uncertainty (uncertainty associated with collecting, analyzing, reducing and reporting concentration data). This appendix focuses on assessing and controlling measurement uncertainty.

2.3.1.1 Measurement Uncertainty for Automated and Manual $PM_{2.5}$ Methods. The goal for acceptable measurement uncertainty is defined as 10 percent coefficient of variation (CV) for total precision and ± 10 percent for total bias.

2.3.1.2 Measurement Uncertainty for Automated Ozone Methods. The goal for acceptable measurement uncertainty is defined for precision as an upper 90 percent confidence limit for the coefficient variation (CV) of 7 percent and for bias as an upper 95 percent confidence limit for the absolute bias of 7 percent.

2.3.1.3 Measurement Uncertainty for $PM_{10-2.5}$ Methods. The goal for acceptable measurement uncertainty is defined for precision as an upper 90 percent confidence limit for the coefficient variation (CV) of 15 percent and for bias as an upper 95 percent confidence limit for the absolute bias of 15 percent.

2.4 National Performance Evaluation Programs. Monitoring plans or QAPP shall provide for the implementation of a program of independent and adequate audits of all monitors providing data for SLAMS and PSD including the provision of adequate resources for such audit programs. A monitoring plan (or QAPP) which provides for monitoring organization participation in EPA's National Performance Audit Program (NPAP) and the PM Performance Evaluation Program (PEP) program and which indicates the consent of the monitoring organization for EPA to apply an appropriate portion of the grant funds, which EPA would otherwise award to the monitoring organization for monitoring activities, will be deemed by EPA to meet this requirement. For clarification and to participate, monitoring organizations should contact either the appropriate EPA Regional Quality Assurance (QA) Coordinator at the appropriate EPA Regional Office location, or the NPEP Coordinator, Emissions Monitoring and Analysis Division (D205–02), U.S. Environmental Protection Agency, Research Triangle Park, NC 27711.

2.5 Technical Systems Audit Program. Technical systems audits of each ambient air monitoring organization shall be conducted at least every 3 years by the appropriate EPA Regional Office and reported to the AQS. Systems audit programs are described in reference 10 of this appendix. For further instructions, monitoring organizations should contact the appropriate EPA Regional QA Coordinator.

2.6 Gaseous and Flow Rate Audit Standards.

2.6.1 Gaseous pollutant concentration standards (permeation devices or cylinders of compressed gas) used to obtain test concentrations for carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen oxide (NO), and nitrogen dioxide (NO_2) must be traceable to either a National Institute of Standards and Technology (NIST) Traceable Reference Material (NTRM) or a NIST-certified Gas Manufacturer's Internal Standard (GMIS), certified in accordance with one of the procedures given in reference 4 of this appendix. Vendors advertizing certification with the procedures provided in reference 4 of this appendix and distributing gasses as ''EPA Protocol Gas'' must participate in the EPA Protocol Gas Verification Program or not use ''EPA'' in any form of advertizing.

2.6.2 Test concentrations for ozone (O_3) must be obtained in accordance with the ultra violet photometric calibration procedure specified in appendix D to part 50 of this chapter, or by means of a certified O_3 transfer standard. Consult references 7 and 8 of this appendix for guidance on primary and transfer standards for O_3.

2.6.3 Flow rate measurements must be made by a flow measuring instrument that is traceable to an authoritative volume or other applicable standard. Guidance for certifying some types of flowmeters is provided in reference 10 of this appendix.

2.7 Primary Requirements and Guidance. Requirements and guidance documents for developing the quality system are contained in references 1 through 10 of this appendix, which also contain many suggested procedures, checks, and control specifications. Reference 10 of this appendix describes specific guidance for the development of a quality system for SLAMS. Many specific quality control checks and specifications for methods are included in the respective reference methods described in part 50 of this chapter or in the respective equivalent method descriptions available from EPA (reference 6 of this appendix). Similarly, quality control procedures related to specifically designated reference and equivalent method analyzers are contained in the respective operation or instruction manuals associated with those analyzers.

3. *Measurement Quality Check Requirements*.

This section provides the requirements for performing the measurement quality checks that can be used to assess data quality and with the exception of the flow rate verifications (sections 3.2.3 and 3.3.2 of this appendix) are required to be submitted to the AQS within the same time frame requirements as routine data. Section 3.2 of this appendix describes checks of automated or continuous instruments while section 3.3 describe checks associated with manual sampling instruments. Other quality control samples are identified in the various references described earlier and can be used to control certain aspects of the measurement system.

3.1 Primary Quality Assurance Organization. Estimates of data quality will be calculated on the basis of single monitors, and primary quality assurance organizations. A primary quality assurance organization is defined as a monitoring organization or other organization that is responsible for a set of stations that monitors the same pollutant and for which data quality assessments can be pooled. Each criteria pollutant sampler/monitor at a monitoring station in the SLAMS network must be associated with one, and only one, primary quality assurance organization.

3.1.1 Each primary quality assurance organization shall be defined such that measurement uncertainty among all stations in the organization can be expected to be reasonably homogeneous, as a result of common factors. Common factors that should be considered by monitoring organizations in defining primary quality assurance organizations include:

(a) Operation by a common team of field operators according to a common set of procedures;

(b) Use of a common QAPP or standard operating procedures;

(c) Common calibration facilities and standards;

(d) Oversight by a common quality assurance organization; and

(e) Support by a common management, laboratory or headquarters.

3.1.2 Primary quality assurance organizations are not necessarily related to the organization reporting data to the AQS. Monitoring organizations having difficulty in defining the primary quality assurance organizations or in assigning specific sites to primary quality assurance organizations should consult with the appropriate EPA Regional Office. All definitions of primary quality assurance organizations shall be subject to final approval by the appropriate EPA Regional Office during scheduled network reviews or systems audits.

3.1.3 Assessment results shall be reported as specified in section 5 of this appendix.

3.2 Measurement Quality Checks of Automated Methods. Table A–2 of this appendix provides a summary of the types and frequency of the measurement quality checks that will be described in this section.

3.2.1 One-Point Quality Control Check for SO_2, NO_2, O_3, and CO. A one-point quality control (QC) check must be performed at least once every 2 weeks on each automated analyzer used to measure SO_2, NO_2, O_3 and CO. The frequency of QC checks may be reduced based upon review, assessment and approval of the EPA Regional Administrator. However, with the advent of automated calibration systems more frequent checking is encouraged. See Reference 10 of this appendix for guidance on the review procedure. The QC check is made by challenging the analyzer with a QC check gas of known concentration (effective concentration for open path analyzers) between 0.01 and 0.10 parts per million (ppm) for SO_2, NO_2, and O_3, and between 1 and 10 ppm for CO analyzers. The ranges allow for appropriate check gas selection for SLAMS sites that may be sampling for different objectives, i.e., trace gas monitoring vs. comparison to National Ambient Air Quality Standards (NAAQS). It is suggested that the QC check gas concentration selected should be related to the routine concentrations normally measured at sites within the monitoring network in order to appropriately reflect the precision and bias at these routine concentration ranges. To check the precision and bias of SLAMS analyzers operating at ranges either above or below the levels identified, use check gases of appropriate concentrations as approved by the appropriate EPA Regional Administrator or their designee. The standards from which check concentrations are obtained must meet the specifications of section 2.6 of this appendix.

3.2.1.1 Except for certain CO analyzers described below, point analyzers must operate in their normal sampling mode during the QC check, and the test atmosphere must pass through all filters, scrubbers, conditioners and other components used during normal ambient sampling and as much of the ambient air inlet system as is practicable. If permitted by the associated operation or instruction manual, a CO point analyzer may be temporarily modified during the QC check to reduce vent or purge flows, or the test atmosphere may enter the analyzer at a point other than the normal sample inlet, provided that the analyzer's response is not likely to be altered by these deviations from the normal operational mode. If a QC check is made in conjunction with a zero or span adjustment, it must be made prior to such zero or span adjustments.

3.2.1.2 Open path analyzers are tested by inserting a test cell containing a QC check gas concentration into the optical measurement beam of the instrument. If possible, the normally used transmitter, receiver, and as appropriate, reflecting devices should be used during the test and the normal monitoring configuration of the instrument should be altered as little as possible to accommodate the test cell for the test. However, if permitted by the associated operation or instruction manual, an alternate local light source or an alternate optical path that does not include the normal atmospheric monitoring path may be used. The actual concentration of the QC check gas in the test cell must be selected to produce an effective concentration in the range specified earlier in this section. Generally, the QC test concentration measurement will be the sum of the atmospheric pollutant concentration and the QC test concentration. If so, the result must be corrected to remove the atmospheric concentration contribution. The corrected concentration is obtained by subtracting the average of the atmospheric concentrations measured by the open path instrument under test immediately before and immediately after the QC test from the QC check gas concentration measurement. If the difference between these before and after measurements is greater than 20 percent of the effective concentration of the test gas, discard the test result and repeat the test. If possible, open path analyzers should be tested during periods when the atmospheric pollutant concentrations are relatively low and steady.

3.2.1.3 Report the audit concentration (effective concentration for open path analyzers) of the QC gas and the corresponding measured concentration (corrected concentration, if applicable, for open path analyzers) indicated by the analyzer. The percent differences between these concentrations are used to assess the precision and bias of the monitoring data as described in sections 4.1.2 (precision) and 4.1.3 (bias) of this appendix.

3.2.2 Performance evaluation for SO_2, NO_2, O_3, or CO. Each calendar quarter (during which analyzers are operated), evaluate at least 25 percent of the SLAMS analyzers that monitor for SO_2, NO_2, O_3, or CO such that each analyzer is evaluated at least once per year. If there are fewer than four analyzers for a pollutant within a primary quality assurance organization, it is suggested to randomly evaluate one or more analyzers so that at least one analyzer for that pollutant is evaluated each calendar quarter. Where possible, EPA strongly encourages more frequent evaluations, up to a frequency of once per quarter for each SLAMS analyzer. It is also suggested that the evaluation be conducted by a trained experienced technician other than the routine site operator.

3.2.2.1 (a) The evaluation is made by challenging the analyzer with audit gas standard of known concentration (effective concentration for open path analyzers) from at least three consecutive ranges that are applicable to the analyzer being evaluated:

Audit level	Concentration range, ppm			
	O_3	SO_2	NO_2	CO
1	0.02–0.05	0.0003–0.005	0.0002–0.002	0.08–0.10
2	0.06–0.10	0.006–0.01	0.003–0.005	0.50–1.00
3	0.11–0.20	0.02–0.10	0.006–0.10	1.50–4.00
4	0.21–0.30	0.11–0.40	0.11–0.30	5–15
5	0.31–0.90	0.41–0.90	0.31–0.60	20–50

(b) An additional 4th range is encouraged for those monitors that have the potential for exceeding the concentration ranges described by the initial three selected.

3.2.2.2(a) NO_2 audit gas for chemiluminescence-type NO_2 analyzers must also contain at least 0.08 ppm NO. NO concentrations substantially higher than 0.08 ppm, as may occur when using some gas phase titration (GPT) techniques, may lead to evaluation errors in chemiluminescence analyzers due to inevitable minor NO–NO_X channel imbalance. Such errors may be atypical of routine monitoring errors to the extent that such NO concentrations exceed typical ambient NO concentrations at the site. These errors may be minimized by modifying the GPT technique to lower the NO concentrations remaining in the NO_2 audit gas to levels closer to typical ambient NO concentrations at the site.

(b) To evaluate SLAMS analyzers operating on ranges higher than 0 to 1.0 ppm for SO_2, NO_2, and O_3 or 0 to 50 ppm for CO, use audit gases of appropriately higher concentration as approved by the appropriate EPA Regional Administrator or the Administrators's designee.

3.2.2.3 The standards from which audit gas test concentrations are obtained must meet the specifications of section 2.6 of this appendix. The gas standards and equipment used for evaluations must not be the same as the standards and equipment used for calibration or calibration span adjustments. For SLAMS sites, the auditor should not be the operator or analyst who conducts the routine monitoring, calibration, and analysis. For PSD sites the auditor must not be the operator or analyst who conducts the routine monitoring, calibration, and analysis.

3.2.2.4 For point analyzers, the evaluation shall be carried out by allowing the analyzer to analyze the audit gas test atmosphere in its normal sampling mode such that the test atmosphere passes through all filters, scrubbers, conditioners, and other sample inlet components used during normal ambient sampling and as much of the ambient air inlet system as is practicable. The exception provided in section 3.2.1 of this appendix for certain CO analyzers does not apply for evaluations.

3.2.2.5 Open path analyzers are evaluated by inserting a test cell containing the various audit gas concentrations into the optical measurement beam of the instrument. If possible, the normally used transmitter, receiver, and, as appropriate, reflecting devices should be used during the evaluation, and the normal monitoring configuration of the instrument should be modified as little as possible to accommodate the test cell for the evaluation. However, if permitted by the associated operation or instruction manual, an alternate local light source or an alternate optical path that does not include the normal atmospheric monitoring path may be used. The actual concentrations of the audit gas in the test cell must be selected to produce effective concentrations in the evaluation level ranges specified in this section of this appendix. Generally, each evaluation concentration measurement result will be the sum of the atmospheric pollutant concentration and the evaluation test concentration. If so, the result must be corrected to remove the atmospheric concentration contribution. The corrected concentration is obtained by subtracting the average of the atmospheric concentrations measured by the open path instrument under test immediately before and immediately after the evaluation test (or preferably before and after each evaluation concentration level) from the evaluation concentration measurement. If the difference between the before and after measurements is greater than 20 percent of the effective concentration of the test gas standard, discard the test result for that concentration level and repeat the test for that level. If possible, open path analyzers should be evaluated during periods when the atmospheric pollutant concentrations are relatively low and steady. Also, the monitoring path length must be reverified to within ±3 percent to validate the evaluation, since the monitoring path length is critical to the determination of the effective concentration.

3.2.2.6 Report both the evaluation concentrations (effective concentrations for open path analyzers) of the audit gases and the corresponding measured concentration (corrected concentrations, if applicable, for open path analyzers) indicated or produced by the analyzer being tested. The percent differences between these concentrations are used to assess the quality of the monitoring data as described in section 4.1.4 of this appendix.

3.2.3 Flow Rate Verification for Particulate Matter. A one-point flow rate verification check must be performed at least once every month on each automated analyzer used to measure PM_{10}, $PM_{10\text{-}2.5}$ and $PM_{2.5}$. The verification is made by checking the operational flow rate of the analyzer. If the verification is made in conjunction with a flow rate adjustment, it must be made prior to such flow rate adjustment. Randomization of the flow rate verification with respect to time of day, day of week, and routine service and adjustments is encouraged where possible. For the standard procedure, use a flow rate transfer standard certified in accordance with section 2.6 of this appendix to check the analyzer's normal flow rate. Care should be used in selecting and using the flow rate measurement device such that it does not alter the normal operating flow rate of the analyzer. Report the flow rate of the transfer standard and the corresponding flow rate measured (indicated) by the analyzer. The percent differences between the audit and measured flow rates are used to assess the bias of the monitoring data as described in section 4.2.2 of this appendix (using flow rates in lieu of concentrations).

3.2.4 Semi-Annual Flow Rate Audit for Particulate Matter. Every 6 months, audit the flow rate of the PM_{10}, $PM_{10\text{-}2.5}$ and $PM_{2.5}$ particulate analyzers. Where possible, EPA strongly encourages more frequent auditing. It is also suggested that the audit be conducted by a trained experienced technician other than the routine site operator. The audit is made by measuring the analyzer's normal operating flow rate using a flow rate transfer standard certified in accordance with section 2.6 of this appendix. The flow rate standard used for auditing must not be the same flow rate standard used to calibrate the analyzer. However, both the calibration standard and the audit standard may be referenced to the same primary flow rate or volume standard. Great care must be used in auditing the flow rate to be certain that the flow measurement device does not alter the normal operating flow rate of the analyzer. Report the audit flow rate of the transfer standard and the corresponding flow rate measured (indicated) by the analyzer. The percent differences between these flow rates are used to validate the one-point flow rate verification checks used to estimate bias as described in section 4.2.3 of this appendix.

3.2.5 Collocated Procedures for $PM_{10\text{-}2.5}$ and $PM_{2.5}$. For each pair of collocated monitors, designate one sampler as the primary monitor whose concentrations will be used to report air quality for the site, and designate the other as the audit monitor.

3.2.5.1 Each EPA designated Federal reference method (FRM) or Federal equivalent method (FEM) within a primary quality assurance organization must:

(a) Have 15 percent of the monitors collocated (values of .5 and greater round up); and

(b) Have at least 1 collocated monitor (if the total number of monitors is less than 3).

The first collocated monitor must be a designated FRM monitor.

3.2.5.2 In addition, monitors selected for collocation must also meet the following requirements:

(a) A primary monitor designated as an EPA FRM shall be collocated with an audit monitor having the same EPA FRM method designation.

(b) For each primary monitor designated as an EPA FEM, 50 percent of the monitors designated for collocation shall be collocated with an audit monitor having the same method designation and 50 percent of the monitors shall be collocated with an FRM audit monitor. If the primary quality assurance organization only has one FEM monitor it shall be collocated with an FRM audit monitor. If there are an odd number of collocated monitors required, the additional monitor shall be an FRM audit monitor. An example of this procedure is found in Table A–3 of this appendix.

3.2.5.3 The collocated monitors should be deployed according to the following protocol:

(a) 80 percent of the collocated audit monitors should be deployed at sites with annual average or daily concentrations estimated to be within ± 20 percent of the applicable NAAQS and the remainder at what the monitoring organizations designate as high value sites;

(b) If an organization has no sites with annual average or daily concentrations within ± 20 percent of the annual NAAQS (or 24-hour NAAQS if that is affecting the area), 60 percent of the collocated audit monitors should be deployed at those sites with the annual mean concentrations (or 24-hour NAAQS if that is affecting the area) among the highest 25 percent for all sites in the network.

3.2.5.4 In determining the number of collocated sites required for $PM_{2.5}$, monitoring networks for visibility assessments should not be treated independently from networks for particulate matter, as the separate networks may share one or more common samplers. However, for Class I visibility areas, EPA will accept visibility aerosol mass measurement instead of a $PM_{2.5}$ measurement if the latter measurement is unavailable. Any $PM_{2.5}$ monitoring site which does not have a monitor which is an EPA FRM or FEM is not required to be included in the number of sites which are used to determine the number of collocated monitors.

3.2.5.5 For each PSD monitoring network, one site must be collocated. A site with the predicted highest 24-hour pollutant concentration must be selected.

3.2.5.6 The two collocated monitors must be within 4 meters of each other and at least 2 meters apart for flow rates greater than 200 liters/min or at least 1 meter apart for samplers having flow rates less than 200 liters/min to preclude airflow interference. Calibration, sampling, and analysis must be the same for both collocated samplers and the same as for all other samplers in the network.

3.2.5.7 Sample the collocated audit monitor for SLAMS sites on a 12-day schedule; sample PSD sites on a 6-day schedule or every third day for PSD daily monitors. If a primary quality assurance organization has only one collocated monitor, higher sampling frequencies than the 12-day schedule may be needed in order to produce ~25 valid sample pairs a year. Report the measurements from both primary and collocated audit monitors at each collocated sampling site. The calculations for evaluating precision between the two collocated monitors are described in section 4.3.1 of this appendix.

3.2.6 Performance Evaluation Procedures for $PM_{10\text{-}2.5}$ and $PM_{2.5}$. (a) The performance evaluation is an independent assessment used to estimate total measurement system bias. These evaluations will be performed under the PM Performance Evaluation Program (PEP) (section 2.4 of this appendix) or a comparable program. Performance evaluations will be performed on the SLAMS monitors annually within each primary quality assurance organization. For primary quality assurance organizations with less than or equal to five monitoring sites, five valid performance evaluation audits must be collected and reported each year. For primary quality assurance organizations with greater than five monitoring sites, eight valid performance evaluation audits must be collected and reported each year. A valid performance evaluation audit means that both the primary monitor and PEP audit concentrations are valid and above 3 $\mu g/m^3$. Additionally, each year, every designated FRM or FEM within a primary quality assurance organization must:

(1) Have each method designation evaluated each year; and,

(2) Have all FRM or FEM samplers subject to an PEP audit at least once every six years; which equates to approximately 15 percent of the monitoring sites audited each year.

(b) Additional information concerning the Performance Evaluation Program is contained in reference 10 of this appendix. The calculations for evaluating bias between the primary monitor and the performance evaluation monitor for $PM_{2.5}$ are described in section 4.3.2 of this appendix. The calculations for evaluating bias between the primary monitor(s) and the performance evaluation monitors for $PM_{10\text{-}2.5}$ are described in section 4.1.3 of this appendix.

3.3 Measurement Quality Checks of Manual Methods. Table A–2 of this appendix provides a summary of the types and frequency of the measurement quality checks that will be described in this section.

3.3.1 Collocated Procedures for PM_{10}. For each network of manual PM_{10} methods, select 15 percent (or at least one) of the monitoring sites within the primary quality assurance organization for collocated sampling. For purposes of precision assessment, networks for measuring total suspended particulate (TSP) and PM_{10} shall be considered separately from one another. PM_{10} and TSP sites having annual mean particulate matter concentrations among the highest 25 percent of the annual mean concentrations for all the sites in the network must be selected or, if such sites are impractical, alternative sites approved by the EPA Regional Administrator may be selected.

3.3.1.1 In determining the number of collocated sites required for PM_{10}, monitoring networks for lead (Pb) should be treated independently from networks for particulate matter (PM), even though the separate networks may share one or more common samplers. However, a single pair of samplers collocated at a common-sampler monitoring site that meets the requirements for both a collocated Pb site and a collocated PM site may serve as a collocated site for both networks.

3.3.1.2 The two collocated monitors must be within 4 meters of each other and at least 2 meters apart for flow rates greater than 200 liters/min or at least 1 meter apart for samplers having flow rates less than 200 liters/min to preclude airflow interference. Calibration, sampling, analysis and verification/validation procedures must be the same for both collocated samplers and the same as for all other samplers in the network.

3.3.1.3 For each pair of collocated samplers, designate one sampler as the primary sampler whose samples will be used to report air quality for the site, and designate the other as the audit sampler. Sample SLAMS sites on a 12-day schedule; sample PSD sites on a 6-day schedule or every third day for PSD daily samplers. If a primary quality assurance organization has only one collocated monitor, higher sampling frequencies than the 12-day schedule may be needed in order to produce 25 valid sample pairs a year. Report the measurements from both samplers at each collocated sampling site. The calculations for evaluating precision between the two collocated samplers are described in section 4.2.1 of this appendix.

3.3.2 Flow Rate Verification for Particulate Matter. Follow the same procedure as described in section 3.2.3 of this appendix for $PM_{2.5}$, PM_{10}, $PM_{10\text{-}2.5}$ and TSP instruments. The percent differences between the audit and measured flow rates are used to assess the bias of the monitoring data as described in section 4.2.2 of this appendix.

3.3.3 Semi-Annual Flow Rate Audit for Particulate Matter. Follow the same procedure as described in section 3.2.4 of this appendix for $PM_{2.5}$, PM_{10}, $PM_{10\text{-}2.5}$ and TSP instruments. The percent differences between these flow rates are used to validate the one-point flow rate verification checks used to estimate bias as described in section 4.2.3 of this appendix. Great care must be used in auditing high-volume particulate matter samplers having flow regulators because the introduction of resistance plates in the audit flow standard device can cause abnormal flow patterns at the point of flow sensing. For this reason, the flow audit standard should be used with a normal filter in place and without resistance plates in auditing flow-regulated high-volume samplers, or other steps should be taken to assure that flow patterns are not perturbed at the point of flow sensing.

3.3.4 Pb Methods.

3.3.4.1 Annual Flow Rate. For the Pb Reference Method (40 CFR part 50, appendix G), the flow rates of the high-volume Pb samplers shall be verified and audited using the same procedures described in sections 3.3.2 and 3.3.3 of this appendix.

3.3.4.2 Pb Strips. Each calendar quarter or sampling quarter (PSD), audit the Pb

Reference Method analytical procedure using glass fiber filter strips containing a known quantity of Pb. These audit sample strips are prepared by depositing a Pb solution on unexposed glass fiber filter strips of dimensions 1.9 centimeters (cm) by 20.3 cm (3/4 inch by 8 inch) and allowing them to dry thoroughly. The audit samples must be prepared using batches of reagents different from those used to calibrate the Pb analytical equipment being audited. Prepare audit samples in the following concentration ranges:

Range	Pb concentration, µg/strip	Equivalent ambient Pb concentration, µg/m³ [1]
1	100–300	0.5–1.5
2	400–1000	3.0–5.0

[1] Equivalent ambient Pb concentration in µg/m³ is based on sampling at 1.7 m³/min for 24 hours on a 20.3 cm x 25.4 cm (8 inch x 10 inch) glass fiber filter.

(a) Audit samples must be extracted using the same extraction procedure used for exposed filters.

(b) Analyze three audit samples in each of the two ranges each quarter samples are analyzed. The audit sample analyses shall be distributed as much as possible over the entire calendar quarter.

(c) Report the audit concentrations (in µg Pb/strip) and the corresponding measured concentrations (in µg Pb/strip) using AQS unit code 077. The relative percent differences between the concentrations are used to calculate analytical accuracy as described in section 4.4.2 of this appendix.

(d) The audits of an equivalent Pb method are conducted and assessed in the same manner as for the reference method. The flow auditing device and Pb analysis audit samples must be compatible with the specific requirements of the equivalent method.

3.3.5 Collocated Procedures for $PM_{10\text{-}2.5}$ and $PM_{2.5}$. Follow the same procedure as described in section 3.2.5 of this appendix.

3.3.6 Performance Evaluation Procedures for $PM_{10\text{-}2.5}$ and $PM_{2.5}$. Follow the same procedure as described in section 3.2.6 of this appendix.

4. *Calculations for Data Quality Assessment.*

(a) Calculations of measurement uncertainty are carried out by EPA according to the following procedures. Primary quality assurance organizations should report the data for all appropriate measurement quality checks as specified in this appendix even though they may elect to perform some or all of the calculations in this section on their own.

(b) The EPA will provide annual assessments of data quality aggregated by site and primary quality assurance organization for SO_2, NO_2, O_3 and CO and by primary quality assurance organization for PM_{10}, $PM_{2.5}$, $PM_{10\text{-}2.5}$ and Pb.

(c) At low concentrations, agreement between the measurements of collocated samplers, expressed as relative percent difference or percent difference, may be relatively poor. For this reason, collocated measurement pairs are selected for use in the precision and bias calculations only when both measurements are equal to or above the following limits:

(1) TSP: 20 µg/m³.
(2) Pb: 0.15 µg/m³.
(3) PM_{10} (Hi-Vol): 15 µg/m³.
(4) PM_{10} (Lo-Vol): 3 µg/m³.
(5) $PM_{10\text{-}2.5}$ and $PM_{2.5}$: 3 µg/m³.

4.1 Statistics for the Assessment of QC Checks for SO_2, NO_2, O_3 and CO.

4.1.1 Percent Difference. All measurement quality checks start with a comparison of an audit concentration or value (flowrate) to the concentration/value measured by the analyzer and use percent difference as the comparison statistic as described in equation 1 of this section. For each single point check, calculate the percent difference, d_i, as follows:

Equation 1

$$d_i = \frac{\text{meas} - \text{audit}}{\text{audit}} \cdot 100$$

where, *meas* is the concentration indicated by the monitoring organization's instrument and *audit* is the audit concentration of the standard used in the QC check being measured.

4.1.2 Precision Estimate. The precision estimate is used to assess the one-point QC checks for SO_2, NO_2, O_3, or CO described in section 3.2.1 of this appendix. The precision estimator is the coefficient of variation upper bound and is calculated using equation 2 of this section:

Equation 2

$$CV = \sqrt{\frac{n \cdot \sum_{i=1}^{n} d_i^2 - \left(\sum_{i=1}^{n} d_i\right)^2}{n(n-1)}} \cdot \sqrt{\frac{n-1}{X^2_{0.1,n-1}}}$$

where, $X_{0.1,n-1}$ is the 10th percentile of a chi-squared distribution with n–1 degrees of freedom.

4.1.3 Bias Estimate. The bias estimate is calculated using the one-point QC checks for SO_2, NO_2, O_3, or CO described in section 3.2.1 of this appendix and the performance evaluation program for $PM_{10\text{-}2.5}$ described in section 3.2.6 of this appendix. The bias estimator is an upper bound on the mean absolute value of the percent differences as described in equation 3 of this section:

Equation 3

$$|\text{bias}| = AB + t_{0.95,n-1} \cdot \frac{AS}{\sqrt{n}}$$

where, *n* is the number of single point checks being aggregated; $t_{0.95,n-1}$ is the 95th quantile of a t-distribution with n-1 degrees of freedom; the quantity *AB* is the mean of the absolute values of the d_i's and is calculated using equation 4 of this section:

Equation 4

$$AB = \frac{1}{n} \cdot \sum_{i=1}^{n} |d_i|$$

and the quantity *AS* is the standard deviation of the absolute value of the d_i's and is calculated using equation 5 of this section:

Equation 5

$$AS = \sqrt{\frac{n \cdot \sum_{i=1}^{n} |d_i|^2 - \left(\sum_{i=1}^{n} |d_i|\right)^2}{n(n-1)}}$$

4.1.3.1 Assigning a sign (positive/negative) to the bias estimate. Since the bias statistic as calculated in equation 3 of this appendix uses absolute values, it does not have a tendency (negative or positive bias) associated with it. A sign will be designated by rank ordering the percent differences of the QC check samples from a given site for a particular assessment interval.

4.1.3.2 Calculate the 25th and 75th percentiles of the percent differences for each site. The absolute bias upper bound should be flagged as positive if both percentiles are positive and negative if both percentiles are negative. The absolute bias upper bound would not be flagged if the 25th and 75th percentiles are of different signs.

4.1.4 Validation of Bias Using Performance Evaluations. The annual performance evaluations for SO_2, NO_2, O_3, or CO described in section 3.2.2 of this appendix are used to verify the results obtained from the one-point QC checks and to validate those results across a range of concentration levels. To quantify this annually at the site level and at the 3-year primary quality assurance organization level, probability limits will be calculated from the one-point QC checks using equations 6 and 7 of this appendix:

Equation 6

$$\text{Upper probability limit} = m + 1.96 \cdot S$$

Equation 7

$$\text{Lower probability limit} = m + 1.96 \cdot S$$

Where, *m* is the mean (equation 8 of this appendix):

Equation 8

$$m = \frac{1}{k}\sum_{i=1}^{k} d_i$$

where, *k* is the total number of one point QC checks for the interval being evaluated and *S* is the standard deviation of the percent differences (equation 9 of this appendix) as follows:

Equation 9

$$S = \sqrt{\frac{k \cdot \sum_{i=1}^{k} d_i^2 - \left(\sum_{i=1}^{k} d_i\right)^2}{k(k-1)}}$$

4.1.5 Percent Difference. Percent differences for the performance evaluations, calculated using equation 1 of this appendix can be compared to the probability intervals for the respective site or at the primary quality assurance organization level. Ninety-five percent of the individual percent differences (all audit concentration levels) for the performance evaluations should be captured within the probability intervals for the primary quality assurance organization.

4.2 Statistics for the Assessment of PM_{10}.

4.2.1 Precision Estimate from Collocated Samplers. Precision is estimated via duplicate measurements from collocated samplers of the same type. It is recommended that the precision be aggregated at the primary quality assurance organization level quarterly, annually, and at the 3-year level. The data pair would only be considered valid if both concentrations are greater than the minimum values specified in section 4(c) of this appendix. For each collocated data pair, calculate the relative percent difference, d_i, using equation 10 of this appendix:

Equation 10

$$d_i = \frac{X_i - Y_i}{(X_i + Y_i)/2} \cdot 100$$

where, X_i is the concentration from the primary sampler and Y_i is the concentration value from the audit sampler. The coefficient of variation upper bound is calculated using the equation 11 of this appendix:

Equation 11

$$CV = \sqrt{\frac{n \cdot \sum_{i=1}^{n} d_i^2 - \left(\sum_{i=1}^{n} d_i\right)^2}{2n(n-1)}} \cdot \sqrt{\frac{n-1}{X_{0.1,n-1}^2}}$$

where, *n* is the number of valid data pairs being aggregated, and $X_{0.1,n-1}$ is the 10th percentile of a chi-squared distribution with n–1 degrees of freedom. The factor of 2 in the denominator adjusts for the fact that each d_i is calculated from two values with error.

4.2.2 Bias Estimate Using One-Point Flow Rate Verifications. For each one-point flow rate verification described in sections 3.2.3 and 3.3.2 of this appendix, calculate the percent difference in volume using equation 1 of this appendix where *meas* is the value indicated by the sampler's volume measurement and *audit* is the actual volume indicated by the auditing flow meter. The absolute volume bias upper bound is then calculated using equation 3, where *n* is the number of flow rate audits being aggregated; $t_{0.95,n-1}$ is the 95th quantile of a t-distribution with n–1 degrees of freedom, the quantity *AB* is the mean of the absolute values of the d_i's and is calculated using equation 4 of this appendix, and the quantity *AS* in equation 3 of this appendix is the standard deviation of the absolute values of the d_i's and is calculated using equation 5 of this appendix.

4.2.3 Assessment Semi-Annual Flow Rate Audits. The flow rate audits described in sections 3.2.4 and 3.3.3 of this appendix are used to assess the results obtained from the one-point flow rate verifications and to provide an estimate of flow rate acceptability. For each flow rate audit, calculate the percent difference in volume using equation 1 of this appendix where *meas* is the value indicated by the sampler's volume measurement and *audit* is the actual volume indicated by the auditing flow meter. To quantify this annually and at the 3-year primary quality assurance organization level, probability limits are calculated from the percent differences using equations 6 and 7 of this appendix where *m* is the mean described in equation 8 of this appendix and *k* is the total number of one-point flow rate verifications for the year and *S* is the standard deviation of the percent differences as described in equation 9 of this appendix.

4.2.4 Percent Difference. Percent differences for the annual flow rate audit concentration, calculated using equation 1 of this appendix, can be compared to the probability intervals for the one-point flow rate verifications for the respective primary quality assurance organization. Ninety-five percent of the individual percent differences (all audit concentration levels) for the performance evaluations should be captured within the probability intervals for primary quality assurance organization.

4.3 Statistics for the Assessment of $PM_{2.5}$ and $PM_{10\text{-}2.5}$.

4.3.1 Precision Estimate. Precision for collocated instruments for $PM_{2.5}$ and $PM_{10\text{-}2.5}$ may be estimated where both the primary and collocated instruments are the same method designation and when the method designations are not similar. Follow the procedure described in section 4.2.1 of this appendix. In addition, one may want to perform an estimate bias when the primary monitor is an FEM and the collocated monitor is an FRM. Follow the procedure described in section 4.1.3 of this appendix in order to provide an estimate of bias using the collocated data.

4.3.2 Bias Estimate. Follow the procedure described in section 4.1.3 of this appendix for the bias estimate of $PM_{10\text{-}2.5}$. The $PM_{2.5}$ bias estimate is calculated using the paired routine and the PEP monitor data described in section 3.2.6 of this appendix. Calculate the percent difference, d_i, using equation 1 of this appendix, where *meas* is the measured concentration from agency's primary monitor and *audit* is the concentration from the PEP monitor. The data pair would only be considered valid if both concentrations are greater than the minimum values specified in section 4(c) of this appendix. Estimates of bias are presented for various levels of aggregation, sometimes aggregating over time, sometimes aggregating over samplers, and sometimes aggregating over both time and samplers. These various levels of aggregation are achieved using the same basic statistic.

4.3.2.1 This statistic averages the individual biases described in equation 1 of this appendix to the desired level of aggregation using equation 12 of this appendix:

Equation 12

$$D = \frac{1}{n_j} \times \sum_{i=1}^{n_j} d_i$$

where, n_j is the number of pairs and $d_1, d_2, \ldots, d_{nj}$ are the biases for each of the pairs to be averaged.

4.3.2.2 Confidence intervals can be constructed for these average bias estimates in equation 12 of this appendix using equations 13 and 14 of this appendix:

Equation 13

$$\text{Lower 90\% Confidence Interval} = D - t_{0.95,df} \times \frac{s}{\sqrt{n_j}}$$

Equation 14

$$\text{Upper 90\% Confidence Interval} = D - t_{0.95,df} \times \frac{s}{\sqrt{n_j}}$$

Where, $t_{0.95,df}$ is the 95th quantile of a t-distribution with degrees of freedom $df=n_j-1$ and *s* is an estimate of the variability of the average bias calculated using equation 15 of this appendix:

Equation 15

$$s = \sqrt{\frac{\sum_{i=1}^{n_j}\left(d_i - D\right)^2}{n_j - 1}}$$

4.4 Statistics for the Assessment of Pb.

4.4.1 Precision Estimate. Follow the same procedures as described for PM_{10} in section 4.2.1 of this appendix using the data from the collocated instruments. The data pair would only be considered valid if both concentrations are greater than the minimum values specified in section 4(c) of this appendix.

4.4.2 Bias Estimate. In order to estimate bias, the information from the flow rate audits and the Pb strip audits needs to be combined as described below. To be consistent with the formulas for the gases, the recommended procedures are to work with relative errors of the lead measurements. The relative error in the concentration is related to the relative error in the volume and the relative error in the mass measurements using equation 16 of this appendix:

Equation 16

$$\text{rel. error} = \frac{\left(\text{measured concentration} - \text{audit concentration}\right)}{\text{audit concentration}} = \left(\frac{1}{1 = \text{rel. error}}\right)\left(\text{rel. mass error} - \text{rel. volume error}\right)$$

As with the gases, an upper bound for the absolute bias is desired. Using equation 16 above, the absolute value of the relative (concentration) error is bounded by equation 17 of this appendix:

Equation 17

$$\left|\text{rel. error}\right| \le \frac{\left|\text{relative mass error}\right| + \left|\text{relative volume error}\right|}{1 - \left|\text{relative volume error}\right|}$$

The quality indicator data collected are then used to bound each part of equation 17 separately.

4.4.2.1 Flow rate calculations. For each flow rate audit, calculate the percent difference in volume by equation 1 of this appendix where *meas* is the value indicated by the sampler's volume measurement and *audit* is the actual volume indicated by the auditing flow meter. The absolute volume bias upper bound is then calculated using equation 3 of this appendix where *n* is the number of flow rate audits being aggregated; $t_{0.95,n-1}$ is the 95th quantile of a t-distribution with $n-1$ degrees of freedom; the quantity *AB* is the mean of the absolute values of the d_i's and is calculated using equation 4, and the quantity *AS* in equation 3 of this appendix is the standard deviation of the absolute values of the d_i's and is calculated using equation 5 of this appendix.

4.4.2.2 Lead strip calculations. Similarly for each lead strip audit, calculate the percent difference in mass by equation 1 where *meas* is the value indicated by the mass measurement and *audit* is the actual lead mass on the audit strip. The absolute mass bias upper bound is then calculated using equation 3 of this appendix where *n* is the number of lead strip audits being aggregated; $t_{0.95,n-1}$ is the 95th quantile of a t-distribution with n-1 degrees of freedom; the quantity *AB* is the mean of the absolute values of the d_i's and is calculated using equation 4 of this appendix and the quantity *AS* in equation 3 of this appendix is the standard deviation of the absolute values of the d_i's and is calculated using equation 5 of this appendix.

4.4.2.3 Final bias calculation. Finally, the absolute bias upper bound is given by combining the absolute bias estimates of the flow rate and Pb strips using equation 18 of this appendix:

Equation 18

$$|\text{bias}| = \frac{|\text{mass bias}| + |\text{vol. bias}|}{100 - |\text{vol. bias}|} \cdot 100$$

where, the numerator and denominator have been multiplied by 100 since everything is expressed as a percentage.

4.5 Time Period for Audits. The statistics in this section assume that the mass and flow rate audits represent the same time period. Since the two types of audits are not performed at the same time, the audits need to be grouped by common time periods. Consequently, the absolute bias estimates should be done on annual and 3-year levels. The flow rate audits are site-specific, so the absolute bias upper bound estimate can be done and treated as a site-level statistic.

5. *Reporting Requirements.*

5.1 SLAMS Reporting Requirements. For each pollutant, prepare a list of all monitoring sites and their AQS site identification codes in each primary quality assurance organization and submit the list to the appropriate EPA Regional Office, with a copy to AQS. Whenever there is a change in this list of monitoring sites in a primary quality assurance organization, report this change to the EPA Regional Office and to AQS.

5.1.1 Quarterly Reports. For each quarter, each primary quality assurance organization shall report to AQS directly (or via the appropriate EPA Regional Office for organizations not direct users of AQS) the results of all valid measurement quality checks it has carried out during the quarter. The quarterly reports must be submitted consistent with the data reporting requirements specified for air quality data as set forth in § 58.16. EPA strongly encourages early submission of the quality assurance data in order to assist the monitoring organizations control and evaluate the quality of the ambient air data.

5.1.2 Annual Reports.

5.1.2.1 When the monitoring organization has certified their data for the calendar year, EPA will calculate and report the measurement uncertainty for the entire calendar year. These limits will then be associated with the data submitted in the annual report required by § 58.15.

5.1.2.2 Each primary quality assurance organization shall submit, along with its annual report, a listing by pollutant of all monitoring sites in the primary quality assurance organization.

5.2 PSD Reporting Requirements. At the end of each sampling quarter, the organization must report the appropriate statistical assessments in section 4 of this appendix for the pollutants measured. All data used to calculate reported estimates of precision and bias including span checks, collocated sampler and audit results must be made available to the permit granting authority upon request.

6.0 References.

(1) American National Standard—Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs. ANSI/ASQC E4–2004. February 2004. Available from American Society for Quality Control, 611 East Wisconsin Avenue, Milwaukee, WI 53202.

(2) EPA Requirements for Quality Management Plans. EPA QA/R–2. EPA/240/B–01/002. March 2001. Office of Environmental Information, Washington DC 20460. *http://www.epa.gov/quality/qs-docs/r2-final.pdf.*

(3) EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations. EPA QA/R–5. EPA/240/B–01/003. March 2001. Office of Environmental Information, Washington DC 20460. *http://www.epa.gov/quality/qs-docs/r5-final.pdf.*

(4) EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards. EPA–600/R–97/121. September 1997. Available from U.S. Environmental Protection Agency, ORD Publications Office, Center for Environmental Research Information (CERI), 26 W. Martin Luther King Drive, Cincinnati, OH 45268.

(5) Guidance for the Data Quality Objectives Process. EPA QA/G–4. EPA/600/R–96/055. August 2000. Office of Environmental Information, Washington DC 20460. *http://www.epa.gov/quality/qs-docs/g4-final.pdf.*

(6) List of Designated Reference and Equivalent Methods. Available from U.S. Environmental Protection Agency, National Exposure Research Laboratory, Human Exposure and Atmospheric Sciences Division, MD–D205–03, Research Triangle Park, NC 27711. *http://www.epa.gov/ttn/amtic/criteria.html.*

(7) McElroy, F.F. Transfer Standards for the Calibration of Ambient Air Monitoring Analyzers for Ozone. EPA–600/4–79–056. U.S. Environmental Protection Agency, Research Triangle Park, NC 27711, September, 1979. *http://www.epa.gov/ttn/amtic/cpreldoc.html.*

(8) Paur, R.J. and F.F. McElroy. Technical Assistance Document for the Calibration of Ambient Ozone Monitors. EPA–600/4–79–057. U.S. Environmental Protection Agency, Research Triangle Park, NC 27711, September, 1979. *http://www.epa.gov/ttn/amtic/cpreldoc.html.*

(9) Quality Assurance Handbook for Air Pollution Measurement Systems, Volume 1—A Field Guide to Environmental Quality Assurance. EPA–600/R–94/038a. April 1994. Available from U.S. Environmental Protection Agency, ORD Publications Office, Center for Environmental Research Information (CERI), 26 W. Martin Luther King Drive, Cincinnati, OH 45268. *http://www.epa.gov/ttn/amtic/qabook.html.*

(10) Quality Assurance Handbook for Air Pollution Measurement Systems, Volume II: Part 1—Ambient Air Quality Monitoring Program Quality System Development. EPA–454/R–98–004. *http://www.epa.gov/ttn/amtic/qabook.html.*

TABLE A–1 OF APPENDIX A TO PART 58.—DIFFERENCE AND SIMILARITIES BETWEEN SLAMS AND PSD REQUIREMENTS

Topic	SLAMS	PSD
Requirements	1. The development, documentation, and implementation of an approved quality system. 2. The assessment of data quality. 3. The use of reference, equivalent, or approved methods. 4. The use of calibration standards traceable to NIST or other primary standard. 5. The participation in EPA performance evaluations and the permission for EPA to conduct system audits.	
Monitoring and QA Responsibility.	State/local agency via the "primary quality assurance organization".	Source owner/operator.
Monitoring Duration	Indefinitely	Usually up to 12 months.
Annual Performance Evaluation (PE).	Standards and equipment different from those used for spanning, calibration, and verifications. Prefer different personnel.	Personnel, standards and equipment different from those used for spanning, calibration, and verifications.
PE audit rate:		
—Automated	100% per year	100% per quarter.
—Manual	Varies depending on pollutant. See Table A–2 of this appendix.	100% per quarter.
Precision Assessment:		
—Automated	One-point QC check biweekly but data quality dependent	One point QC check biweekly.

TABLE A–1 OF APPENDIX A TO PART 58.—DIFFERENCE AND SIMILARITIES BETWEEN SLAMS AND PSD REQUIREMENTS—Continued

Topic	SLAMS	PSD
—Manual	Varies depending on pollutant. See Table A–2 of this appendix.	One site: 1 every 6 days or every third day for daily monitoring (TSP and Pb).
Reporting:		
—Automated	By site—EPA performs calculations annually	By site—source owner/operator performs calculations each sampling quarter.
—Manual	By reporting organization—EPA performs calculations annually.	By site—source owner/operator performs calculations each sampling quarter.

TABLE A–2 OF APPENDIX A TO PART 58.—MINIMUM DATA ASSESSMENT REQUIREMENTS FOR SLAMS SITES

Method	Assessment method	Coverage	Minimum frequency	Parameters reported
Automated Methods				
1-Point QC: for SO_2, NO_2, O_3, CO.	Response check at concentration 0.01–0.1 ppm SO_2, NO_2, O_3, and 1–10 ppm CO.	Each analyzer	Once per 2 weeks.	Audit concentration[1] and measured concentration[2].
Performance Evaluation for SO_2, NO_2, O_3, CO.	See section 3.2.2 of this appendix.	Each analyzer	Once per year	Audit concentration[1] and measured concentration[2] for each level.
Flow rate verification PM_{10}, $PM_{2.5}$, $PM_{10\text{-}2.5}$.	Check of sampler flow rate	Each sampler	Once every month.	Audit flow rate and measured flow rate indicated by the sampler.
Semi-annual flow rate audit PM_{10}, $PM_{2.5}$, $PM_{10\text{-}2.5}$.	Check of sampler flow rate using independent standard.	Each sampler	Once every 6 months.	Audit flow rate and measured flow rate indicated by the sampler.
Collocated Sampling $PM_{2.5}$, $PM_{10\text{-}2.5}$.	Collocated samplers	15%	Every twelve days.	Primary sampler concentration and duplicate sampler concentration.
Performance Evaluation $PM_{2.5}$, $PM_{10\text{-}2.5}$.	Collocated samplers	1. 5 valid audits for primary QA orgs, with ≤5 sites. 2. 8 valid audits for primary QA orgs, with >5 sites. 3. All samplers in 6 years.	over all 4 quarters.	Primary sampler concentration and performance evaluation sampler concentration.
Manual Methods				
Collocated Sampling PM_{10}, TSP, $PM_{10\text{-}2.5}$, $PM_{2.5}$,.	Collocated samplers	15%	Every 12 days, TSP—every 6 days.	Primary sampler concentration and duplicate sampler concentration.
Flow rate verification PM_{10}, TSP, $PM_{10\text{-}2.5}$ $PM_{2.5}$.	Check of sampler flow rate	Each sampler	Once every month.	Audit flow rate and measured flow rate indicated by the sampler.
Semi-annual flow rate audit PM_{10}, TSP, $PM_{10\text{-}2.5}$ $PM_{2.5}$.	Check of sampler flow rate using independent standard.	Each sampler, all locations	Once every 6 months.	Audit flow rate and measured flow rate indicated by the sampler.
Manual Methods Lead.	1. Check of sample flow rate as for TSP. 2. Check of analytical system with Pb audit strips.	1. Each sampler 2. Analytical system	1. Include with TSP. 2. Each quarter	1. Same as for TSP. 2. Actual concentration and measured (indicated) concentration of audit samples (µg Pb/strip).
Performance Evaluation $PM_{2.5}$, $PM_{10\text{-}2.5}$.	Collocated samplers	1. 5 valid audits for primary QA orgs, with ≤5 sites.. 2. 8 valid audits for primary QA orgs, with ≥5 sites. 3. All samplers in 6 years.	Over all 4 quarters.	Primary sampler concentration and performance evaluation sampler concentration.

[1] Effective concentration for open path analyzers.

[2] Corrected concentration, if applicable, for open path analyzers.

TABLE A–3 TO APPENDIX A OF PART 58.—SUMMARY OF $PM_{2.5}$ OR $PM_{10-2.5}$. NUMBER AND TYPE OF COLLOCATION (15% COLLOCATION REQUIREMENT) NEEDED AS AN EXAMPLE OF A PRIMARY QUALITY ASSURANCE ORGANIZATION THAT HAS 54 MONITORS AND PROCURED FRMS AND THREE OTHER EQUIVALENT METHOD TYPES

Primary sampler method designation	Total number of monitors	Total number collocated	Number of collocated FRM	Number of collocated monitors of same method designation as primary
FRM	20	3	3	N/A
FEM (A)	20	3	2	1
FEM (C)	2	1	1	0
FEM (D)	12	2	1	1

50. Appendix C is revised to read as follows:

Appendix C to Part 58—Ambient Air Quality Monitoring Methodology

1.0 Purpose.
2.0 SLAMS Ambient Air Monitoring Stations.
3.0 NCore Ambient Air Monitoring Stations.
4.0 Photochemical Assessment Monitoring Stations (PAMS).
5.0 Particulate Matter Episode Monitoring.
6.0 References.

1.0 Purpose.

This appendix specifies the criteria pollutant monitoring methods (manual methods or automated analyzers) which must be used in the State and local air monitoring stations (SLAMS) and the National Core (NCore) stations that are a subset of SLAMS.

2.0 *SLAMS Ambient Air Monitoring Network.*

2.1 Except as otherwise provided in this appendix, a criteria pollutant monitoring method used for making NAAQS decisions at a SLAMS site must be a reference or equivalent method as defined in § 50.1 of this chapter.

2.2 Through December 31, 2012, data produced from any PM_{10} method approved under part 53 of this chapter may be used in lieu of a required $PM_{10-2.5}$ monitor to determine attainment of the $PM_{10-2.5}$ NAAQS according to the following stipulations.

2.2.1 At any sites proposed for monitoring in lieu of $PM_{10-2.5}$ monitoring, the 98th percentile value for the most recent complete calendar year of PM_{10} monitoring data must be less than the $PM_{10-2.5}$ NAAQS, based on a sample frequency of at least 1 in 3 sample days, and reported at local conditions of temperature and pressure.

2.2.2 PM_{10} data used in lieu of required $PM_{10-2.5}$ monitoring must be based on a daily sampling frequency.

2.2.3 During any calendar year of sampling in lieu of a required $PM_{10-2.5}$ sampler, if more than seven 24-hour average PM_{10} concentrations exceed the numerical value of the $PM_{10-2.5}$ NAAQS, as reported at local conditions of temperature and pressure, the State must deploy a Federal reference method (FRM) or Federal equivalent method (FEM) $PM_{10-2.5}$ monitor within a 1-year period.

2.3 Any manual method or analyzer purchased prior to cancellation of its reference or equivalent method designation under § 53.11 or § 53.16 of this chapter may be used at a SLAMS site following cancellation for a reasonable period of time to be determined by the Administrator.

2.4 Approval of Non-designated Continuous $PM_{2.5}$ Methods as Approved Regional Methods (ARM) Operated Within a Network of Sites. A method for $PM_{2.5}$ that has not been designated as an FRM or FEM as defined in § 50.1 of this chapter may be approved as an approved regional method (ARM) for purposes of section 2.1 of this appendix at a particular site or network of sites under the following stipulations.

2.4.1 The candidate ARM must be demonstrated to meet the requirements for $PM_{2.5}$ Class III equivalent methods as defined in subpart C of part 53 of this chapter. Specifically the requirements for precision, correlation, and additive and multiplicative bias apply. For purposes of this section 2.4, the following requirements shall apply:

2.4.1.1 The candidate ARM shall be tested at the site(s) in which it is intended to be used. For a network of sites operated by one reporting agency, the testing shall occur at a subset of sites to include one site in each MSA/CSA, up to the first 2 highest population MSA/CSA and at least one rural area or Micropolitan Statistical Area site. If the candidate ARM for a network is already approved for purposes of this section in another agency's network, subsequent testing shall minimally occur at one site in a MSA/CSA and one rural area or Micropolitan Statistical Area. There shall be no requirement for tests at any other sites.

2.4.1.2 For purposes of this section, a full year of testing may begin and end in any season, so long as all seasons are covered.

2.4.1.3 No PM_{10} samplers shall be required for the test, as determination of the $PM_{2.5}/PM_{10}$ ratio at the test site shall not be required.

2.4.1.4 The test specification for $PM_{2.5}$ Class III equivalent method precision defined in subpart C of part 53 of this chapter applies; however, there is no specific requirement that collocated continuous monitors be operated for purposes of generating a statistic for coefficient of variation (CV). To provide an estimate of precision that meets the requirement identified in subpart C of part 53 of this chapter, agencies may cite peer-reviewed published data or data in AQS that can be presented demonstrating the candidate ARM operated will produce data that meets the specification for precision of Class III $PM_{2.5}$ methods.

2.4.1.5 A minimum of 90 valid sample pairs per site for the year with no less than 20 valid sample pairs per season must be generated for use in demonstrating that additive bias, multiplicative bias and correlation meet the comparability requirements specified in subpart C of part 53 of this chapter. A valid sample pair may be generated with as little as one valid FRM and one valid candidate ARM measurement per day.

2.4.1.6 For purposes of determining bias, FRM data with concentrations less than 3 micrograms per cubic meter $\mu g/m^3$) may be excluded. Exclusion of data does not result in failure of sample completeness specified in this section.

2.4.2 The monitoring agency wishing to use an ARM must develop and implement appropriate quality assurance procedures for the method. Additionally, the following procedures are required for the method:

2.4.2.1 The ARM must be consistently operated throughout the network. Exceptions to a consistent operation must be approved according to section 2.8 of this appendix;

2.4.2.2 The ARM must be operated on an hourly sampling frequency capable of providing data suitable for aggregation into daily 24-hour average measurements;

2.4.2.3 The ARM must use an inlet and separation device, as needed, that are already approved in either the reference method identified in appendix L to part 50 of this chapter or under part 53 of this chapter as approved for use on a $PM_{2.5}$ reference or equivalent method. The only exceptions to this requirement are those methods that by their inherent measurement principle may not need an inlet or separation device that segregates the aerosol; and

2.4.2.4 The ARM must be capable of providing for flow audits, unless by its inherent measurement principle, measured flow is not required. These flow audits are to be performed on the frequency identified in appendix A to this part.

2.4.3 The monitoring agency wishing to use the method must develop and implement appropriate procedures for assessing and reporting the precision and accuracy of the method comparable to the procedures set forth in appendix A of this part for designated reference and equivalent methods.

2.4.4 Assessments of data quality shall follow the same frequencies and calculations as required under section 3 of appendix A to this part with the following exceptions:

2.4.4.1 Collocation of ARM with FRM/FEM samplers must be maintained at a minimum of 30 percent of the SLAMS sites with a minimum of 1 per network;

2.4.4.2 All collocated FRM/FEM samplers must maintain a sample frequency of at least 1 in 6 sample days;

2.4.4.3 Collocated FRM/FEM samplers shall be located at the design value site, with the required FRM/FEM samplers deployed among the largest MSA/CSA in the network, until all required FRM/FEM are deployed; and

2.4.4.4 Data from collocated FRM/FEM are to be substituted for any calendar quarter that an ARM method has incomplete data.

2.4.4.5 Collocation with an ARM under this part for purposes of determining the coefficient of variation of the method shall be conducted at a minimum of 7.5 percent of the sites with a minimum of 1 per network. This is consistent with the requirements in appendix A to this part for one-half of the required collocation of FRM/FEM (15 percent) to be collocated with the same method.

2.4.4.6 Assessments of bias with an independent audit of the total measurement system shall be conducted with the same frequency as an FEM as identified in appendix A to this part.

2.4.5 Request for approval of a candidate ARM, that is not already approved in another agency's network under this section, must meet the general submittal requirements of section 2.7 of this appendix. Requests for approval under this section when an ARM is already approved in another agency's network are to be submitted to the EPA Regional Administrator. Requests for approval under section 2.4 of this appendix must include the following requirements:

2.4.5.1 A clear and unique description of the site(s) at which the candidate ARM will be used and tested, and a description of the nature or character of the site and the particulate matter that is expected to occur there.

2.4.5.2 A detailed description of the method and the nature of the sampler or analyzer upon which it is based.

2.4.5.3 A brief statement of the reason or rationale for requesting the approval.

2.4.5.4 A detailed description of the quality assurance procedures that have been developed and that will be implemented for the method.

2.4.5.5 A detailed description of the procedures for assessing the precision and accuracy of the method that will be implemented for reporting to AQS.

2.4.5.6 Test results from the comparability tests as required in section 2.4.1 through 2.4.1.4 of this appendix.

2.4.5.7 Such further supplemental information as may be necessary or helpful to support the required statements and test results.

2.4.6 Within 120 days after receiving a request for approval of the use of an ARM at a particular site or network of sites under section 2.4 of this appendix, the Administrator will approve or disapprove the method by letter to the person or agency requesting such approval. When appropriate for methods that are already approved in another SLAMS network, the EPA Regional Administrator has approval/disapproval authority. In either instance, additional information may be requested to assist with the decision.

2.5 [Reserved]

2.6 Use of Methods With Higher, Nonconforming Ranges in Certain Geographical Areas.

2.6.1 [Reserved]

2.6.2 An analyzer may be used (indefinitely) on a range which extends to concentrations higher than two times the upper limit specified in table B–1 of part 53 of this chapter if:

2.6.2.1 The analyzer has more than one selectable range and has been designated as a reference or equivalent method on at least one of its ranges, or has been approved for use under section 2.5 (which applies to analyzers purchased before February 18, 1975);

2.6.2.2 The pollutant intended to be measured with the analyzer is likely to occur in concentrations more than two times the upper range limit specified in table B–1 of part 53 of this chapter in the geographical area in which use of the analyzer is proposed; and

2.6.2.3 The Administrator determines that the resolution of the range or ranges for which approval is sought is adequate for its intended use. For purposes of this section (2.6), ''resolution'' means the ability of the analyzer to detect small changes in concentration.

2.6.3 Requests for approval under section 2.6.2 of this appendix must meet the submittal requirements of section 2.7. Except as provided in section 2.7.3 of this appendix, each request must contain the information specified in section 2.7.2 in addition to the following:

2.6.3.1 The range or ranges proposed to be used;

2.6.3.2 Test data, records, calculations, and test results as specified in section 2.7.2.2 of this appendix for each range proposed to be used;

2.6.3.3 An identification and description of the geographical area in which use of the analyzer is proposed;

2.6.3.4 Data or other information demonstrating that the pollutant intended to be measured with the analyzer is likely to occur in concentrations more than two times the upper range limit specified in table B–1 of part 53 of this chapter in the geographical area in which use of the analyzer is proposed; and

2.6.3.5 Test data or other information demonstrating the resolution of each proposed range that is broader than that permitted by section 2.5 of this appendix.

2.6.4 Any person who has obtained approval of a request under this section (2.6.2) shall assure that the analyzer for which approval was obtained is used only in the geographical area identified in the request and only while operated in the range or ranges specified in the request.

2.7 Requests for Approval; Withdrawal of Approval.

2.7.1 Requests for approval under sections 2.4, 2.6.2, or 2.8 of this appendix must be submitted to: Director, National Exposure Research Laboratory, (MD–D205–03), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711. For ARM that are already approved in another agency's network, subsequent requests for approval under section 2.4 are to be submitted to the applicable EPA Regional Administrator.

2.7.2 Except as provided in section 2.7.3 of this appendix, each request must contain:

2.7.2.1 A statement identifying the analyzer (*e.g.*, by serial number) and the method of which the analyzer is representative (*e.g.*, by manufacturer and model number); and 2.7.2.2 Test data, records, calculations, and test results for the analyzer (or the method of which the analyzer is representative) as specified in subpart B, subpart C, or both (as applicable) of part 53 of this chapter.

2.7.3 A request may concern more than one analyzer or geographical area and may incorporate by reference any data or other information known to EPA from one or more of the following:

2.7.3.1 An application for a reference or equivalent method determination submitted to EPA for the method of which the analyzer is representative, or testing conducted by the applicant or by EPA in connection with such an application;

2.7.3.2 Testing of the method of which the analyzer is representative at the initiative of the Administrator under § 53.7 of this chapter; or

2.7.3.3 A previous or concurrent request for approval submitted to EPA under this section (2.7).

2.7.4 To the extent that such incorporation by reference provides data or information required by this section (2.7) or by sections 2.4, 2.5, or 2.6 of this appendix, independent data or duplicative information need not be submitted.

2.7.5 After receiving a request under this section (2.7), the Administrator may request such additional testing or information or conduct such tests as may be necessary in his judgment for a decision on the request.

2.7.6 If the Administrator determines, on the basis of any available information, that any of the determinations or statements on which approval of a request under this section was based are invalid or no longer valid, or that the requirements of section 2.4, 2.5, or 2.6, as applicable, have not been met, he/she may withdraw the approval after affording the person who obtained the approval an opportunity to submit information and arguments opposing such action.

2.8 Modifications of Methods by Users.

2.8.1 Except as otherwise provided in this section, no reference method, equivalent method, or ARM may be used in a SLAMS network if it has been modified in a manner that could significantly alter the performance characteristics of the method without prior approval by the Administrator. For purposes of this section, ''alternative method'' means an analyzer, the use of which has been approved under section 2.4, 2.5, or 2.6 of this appendix or some combination thereof.

2.8.2 Requests for approval under this section (2.8) must meet the submittal requirements of sections 2.7.1 and 2.7.2.1 of this appendix.

2.8.3 Each request submitted under this section (2.8) must include:

2.8.3.1 A description, in such detail as may be appropriate, of the desired modification;

2.8.3.2 A brief statement of the purpose(s) of the modification, including any reasons for considering it necessary or advantageous;

2.8.3.3 A brief statement of belief concerning the extent to which the modification will or may affect the performance characteristics of the method; and

2.8.3.4 Such further information as may be necessary to explain and support the statements required by sections 2.8.3.2 and 2.8.3.3.

2.8.4 The Administrator will approve or disapprove the modification by letter to the person or agency requesting such approval within 75 days after receiving a request for approval under this section and any further information that the applicant may be asked to provide.

2.8.5 A temporary modification that could alter the performance characteristics of a reference, equivalent, or ARM may be made without prior approval under this section if the method is not functioning or is malfunctioning, provided that parts necessary for repair in accordance with the applicable operation manual cannot be obtained within 45 days. Unless such temporary modification is later approved under section 2.8.4 of this appendix, the temporarily modified method shall be repaired in accordance with the applicable operation manual as quickly as practicable but in no event later than 4 months after the temporary modification was made, unless an extension of time is granted by the Administrator. Unless and until the temporary modification is approved, air quality data obtained with the method as temporarily modified must be clearly identified as such when submitted in accordance with § 58.16 and must be accompanied by a report containing the information specified in section 2.8.3 of this appendix. A request that the Administrator approve a temporary modification may be submitted in accordance with sections 2.8.1 through 2.8.4 of this appendix. In such cases the request will be considered as if a request for prior approval had been made.

2.9 Use of IMPROVE Samplers at a SLAMS Site. ‘‘IMPROVE’’ samplers may be used in SLAMS for monitoring of regional background and regional transport concentrations of fine particulate matter. The IMPROVE samplers were developed for use in the Interagency Monitoring of Protected Visual Environments (IMPROVE) network to characterize all of the major components and many trace constituents of the particulate matter that impair visibility in Federal Class I Areas. Descriptions of the IMPROVE samplers and the data they collect are available in references 4, 5, and 6 of this appendix.

3.0 *NCore Ambient Air Monitoring Stations.*

3.1 Methods employed in NCore multipollutant sites used to measure SO_2, CO, NO_2, O_3, $PM_{2.5}$, or $PM_{10-2.5}$ must be reference or equivalent methods as defined in § 50.1 of this chapter, or an ARM as defined in section 2.4 of this appendix, for any monitors intended for comparison with applicable NAAQS.

3.2 If alternative SO_2, CO, NO_2, O_3, $PM_{2.5}$, or $PM_{10-2.5}$ monitoring methodologies are proposed for monitors not intended for NAAQS comparison, such techniques must be detailed in the network description required by § 58.10 and subsequently approved by the Administrator.

4.0 *Photochemical Assessment Monitoring Stations (PAMS).*

4.1 Methods used for O_3 monitoring at PAMS must be automated reference or equivalent methods as defined in § 50.1 of this chapter.

4.2 Methods used for NO, NO_2 and NO_X monitoring at PAMS should be automated reference or equivalent methods as defined for NO_2 in § 50.1 of this chapter. If alternative NO, NO_2 or NO_X monitoring methodologies are proposed, such techniques must be detailed in the network description required by § 58.10 and subsequently approved by the Administrator.

4.3 Methods for meteorological measurements and speciated VOC monitoring are included in the guidance provided in references 2 and 3 of this appendix. If alternative VOC monitoring methodology (including the use of new or innovative technologies), which is not included in the guidance, is proposed, it must be detailed in the network description required by § 58.10 and subsequently approved by the Administrator.

5.0 *Particulate Matter Episode Monitoring.*

5.1 For short-term measurements of PM_{10} during air pollution episodes (see § 51.152 of this chapter) the measurement method must be:

5.1.1 Either the ‘‘Staggered PM_{10}’’ method or the ‘‘PM_{10} Sampling Over Short Sampling Times’’ method, both of which are based on the reference method for PM_{10} and are described in reference 1: or

5.1.2 Any other method for measuring PM_{10}:

5.1.2.1 Which has a measurement range or ranges appropriate to accurately measure air pollution episode concentration of PM_{10},

5.1.2.2 Which has a sample period appropriate for short-term PM_{10} measurements, and 5.1.2.3 For which a quantitative relationship to a reference or equivalent method for PM_{10} has been established at the use site. Procedures for establishing a quantitative site-specific relationship are contained in reference 1.

5.2 PM_{10} methods other than the reference method are not covered under the quality assessment requirements of appendix A to this part. Therefore, States must develop and implement their own quality assessment procedures for those methods allowed under this section 4. These quality assessment procedures should be similar or analogous to those described in section 3 of appendix A to this part for the PM_{10} reference method.

6.0 *References.*

1. Pelton, D. J. Guideline for Particulate Episode Monitoring Methods, GEOMET Technologies, Inc., Rockville, MD. Prepared for U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA Contract No. 68–02–3584. EPA 450/4–83–005. February 1983.

2. Technical Assistance Document For Sampling and Analysis of Ozone Precursors. Atmospheric Research and Exposure Assessment Laboratory, U.S. Environmental Protection Agency, Research Triangle Park, NC 27711. EPA 600/8–91–215. October 1991.

3. Quality Assurance Handbook for Air Pollution Measurement Systems: Volume IV. Meteorological Measurements. Atmospheric Research and Exposure Assessment Laboratory, U.S. Environmental Protection Agency, Research Triangle Park, NC 27711. EPA 600/4–90–0003. August 1989.

4. Eldred, R.A., Cahill, T.A., Wilkenson, L.K., *et al.*, Measurements of fine particles and their chemical components in the IMPROVE/NPS networks, in Transactions of the International Specialty Conference on Visibility and Fine Particles, Air and Waste Management Association: Pittsburgh, PA, 1990; pp 187–196.

5. Sisler, J.F., Huffman, D., and Latimer, D.A.; Spatial and temporal patterns and the chemical composition of the haze in the United States: An analysis of data from the IMPROVE network, 1988–1991, ISSN No. 0737–5253–26, National Park Service, Ft. Collins, CO, 1993.

6. Eldred, R.A., Cahill, T.A., Pitchford, M., and Malm, W.C.; IMPROVE—a new remote area particulate monitoring system for visibility studies, Proceedings of the 81st Annual Meeting of the Air Pollution Control Association, Dallas, Paper 88–54.3, 1988.

51. Appendix D to part 58 is revised to read as follows:

Appendix D to Part 58—Network Design Criteria for Ambient Air Quality Monitoring

1. Monitoring Objectives and Spatial Scales.
2. General Monitoring Requirements.
3. Design Criteria for NCore Sites.
4. Pollutant-Specific Design Criteria for SLAMS Sites.
5. Design Criteria for Photochemical Assessment Monitoring Stations (PAMS).
6. References.

1. *Monitoring Objectives and Spatial Scales.*

The purpose of this appendix is to describe monitoring objectives and general criteria to be applied in establishing the required SLAMS ambient air quality monitoring stations and for choosing general locations for additional monitoring sites. This appendix also describes specific requirements for the number and location of FRM, FEM, and ARM sites for specific pollutants, NCore multipollutant sites, $PM_{10-2.5}$ mass sites, chemically-speciated $PM_{10-2.5}$ sites, continuous $PM_{2.5}$ mass sites, chemically-speciated $PM_{2.5}$ sites, and O_3 precursor measurements sites (PAMS). These criteria will be used by EPA in evaluating the adequacy of the air pollutant monitoring networks.

1.1 Monitoring Objectives. The ambient air monitoring networks must be designed to meet three basic monitoring objectives. These basic objectives are listed below. The appearance of any one objective in the order of this list is not based upon a prioritized scheme. Each objective is important and must be considered individually.

(a) Provide air pollution data to the general public in a timely manner. Data can be presented to the public in a number of attractive ways including through air quality maps, newspapers, Internet sites, and as part of weather forecasts and public advisories.

(b) Support compliance with ambient air quality standards and emissions strategy development. Data from FRM, FEM, and ARM monitors will be used for comparing an area's air pollution levels against the National Ambient Air Quality Standards (NAAQS). Data from monitors of various types can be used in the development of attainment and maintenance plans. SLAMS, and especially NCore station data, will be used to evaluate the regional air quality models used in developing emission strategies, and to track trends in air pollution abatement control measures' impact on improving air quality. In monitoring locations near major air pollution sources, source-oriented monitoring data can provide insight into how well industrial sources are controlling their pollutant emissions.

(c) Support for air pollution research studies. Air pollution data from the NCore network can be used to supplement data collected by researchers working on health effects assessments and atmospheric processes, or for monitoring methods development work.

1.1.1 In order to support the air quality management work indicated in the three basic air monitoring objectives, a network must be designed with a variety of types of monitoring sites. Monitoring sites must be capable of informing managers about many things including the peak air pollution levels, typical levels in populated areas, air pollution transported into and outside of a city or region, and air pollution levels near specific sources. To summarize some of these sites, here is a listing of six general site types:

(a) Sites located to determine the highest concentrations expected to occur in the area covered by the network.

(b) Sites located to measure typical concentrations in areas of high population density.

(c) Sites located to determine the impact of significant sources or source categories on air quality.

(d) Sites located to determine general background concentration levels.

(e) Sites located to determine the extent of Regional pollutant transport among populated areas; and in support of secondary standards.

(f) Sites located to measure air pollution impacts on visibility, vegetation damage, or other welfare-based impacts.

1.1.2 This appendix contains criteria for the basic air monitoring requirements. The total number of monitoring sites that will serve the variety of data needs will be substantially higher than these minimum requirements provide. The optimum size of a particular network involves trade-offs among data needs and available resources. This regulation intends to provide for national air monitoring needs, and to lend support for the flexibility necessary to meet data collection needs of area air quality managers. EPA, State, and local agencies will periodically collaborate on network design issues through the network assessment process outlined in § 58.10.

1.1.3 This appendix focuses on the relationship between monitoring objectives, site types, and the geographic location of monitoring sites. Included are a rationale and set of general criteria for identifying candidate site locations in terms of physical characteristics which most closely match a specific monitoring objective. The criteria for more specifically locating the monitoring site, including spacing from roadways and vertical and horizontal probe and path placement, are described in appendix E to this part.

1.2 Spatial Scales. (a) To clarify the nature of the link between general monitoring objectives, site types, and the physical location of a particular monitor, the concept of spatial scale of representativeness is defined. The goal in locating monitors is to correctly match the spatial scale represented by the sample of monitored air with the spatial scale most appropriate for the monitoring site type, air pollutant to be measured, and the monitoring objective.

(b) Thus, spatial scale of representativeness is described in terms of the physical dimensions of the air parcel nearest to a monitoring site throughout which actual pollutant concentrations are reasonably similar. The scales of representativeness of most interest for the monitoring site types described above are as follows:

(1) *Microscale*—defines the concentrations in air volumes associated with area dimensions ranging from several meters up to about 100 meters.

(2) *Middle scale*—defines the concentration typical of areas up to several city blocks in size with dimensions ranging from about 100 meters to 0.5 kilometer.

(3) *Neighborhood scale*—defines concentrations within some extended area of the city that has relatively uniform land use with dimensions in the 0.5 to 4.0 kilometers range. The neighborhood and urban scales listed below have the potential to overlap in applications that concern secondarily formed or homogeneously distributed air pollutants.

(4) *Urban scale*—defines concentrations within an area of city-like dimensions, on the order of 4 to 50 kilometers. Within a city, the geographic placement of sources may result in there being no single site that can be said to represent air quality on an urban scale.

(5) *Regional scale*—defines usually a rural area of reasonably homogeneous geography without large sources, and extends from tens to hundreds of kilometers.

(6) *National and global scales*—these measurement scales represent concentrations characterizing the nation and the globe as a whole.

(c) Proper siting of a monitor requires specification of the monitoring objective, the types of sites necessary to meet the objective, and then the desired spatial scale of representativeness. For example, consider the case where the objective is to determine NAAQS compliance by understanding the maximum ozone concentrations for an area. Such areas would most likely be located downwind of a metropolitan area, quite likely in a suburban residential area where children and other susceptible individuals are likely to be outdoors. Sites located in these areas are most likely to represent an urban scale of measurement. In this example, physical location was determined by considering ozone precursor emission patterns, public activity, and meteorological characteristics affecting ozone formation and dispersion. Thus, spatial scale of representativeness was not used in the selection process but was a result of site location.

(d) In some cases, the physical location of a site is determined from joint consideration of both the basic monitoring objective and the type of monitoring site desired, or required by this appendix. For example, to determine $PM_{2.5}$ concentrations which are typical over a geographic area having relatively high $PM_{2.5}$ concentrations, a neighborhood scale site is more appropriate. Such a site would likely be located in a residential or commercial area having a high overall $PM_{2.5}$ emission density but not in the immediate vicinity of any single dominant source. Note that in this example, the desired scale of representativeness was an important factor in determining the physical location of the monitoring site.

(e) In either case, classification of the monitor by its type and spatial scale of representativeness is necessary and will aid in interpretation of the monitoring data for a particular monitoring objective (*e.g.*, public reporting, NAAQS compliance, or research support).

(f) Table D–1 of this appendix illustrates the relationship between the various site types that can be used to support the three basic monitoring objectives, and the scales of representativeness that are generally most appropriate for that type of site.

TABLE D–1 OF APPENDIX D TO PART 58.—RELATIONSHIP BETWEEN SITE TYPES AND SCALES OF REPRESENTATIVENESS

Site type	Appropriate siting scales
1. Highest concentration	Micro, middle, neighborhood (*sometimes* urban or regional for secondarily formed pollutants).
2. Population oriented	Neighborhood, urban.
3. Source impact	Micro, middle, neighborhood.

TABLE D–1 OF APPENDIX D TO PART 58.—RELATIONSHIP BETWEEN SITE TYPES AND SCALES OF REPRESENTATIVENESS—Continued

Site type	Appropriate siting scales
4. General/background & regional transport	Urban, regional.
5. Welfare-related impacts	Urban, regional.

2. *General Monitoring Requirements.*

(a) The National ambient air monitoring system includes several types of monitoring stations, each targeting a key data collection need and each varying in technical sophistication.

(b) Research grade sites are platforms for scientific studies, either involved with health or welfare impacts, measurement methods development, or other atmospheric studies. These sites may be collaborative efforts between regulatory agencies and researchers with specific scientific objectives for each. Data from these sites might be collected with both traditional and experimental techniques, and data collection might involve specific laboratory analyses not common in routine measurement programs. The research grade sites are not required by regulation; however, they are mentioned here due to their important role in supporting the air quality management program.

(c) The NCore multipollutant sites are sites that measure multiple pollutants in order to provide support to integrated air quality management data needs. NCore sites include urban scale measurements in general, in a selection of metropolitan areas and a limited number of more rural locations. Continuous monitoring methods are to be used at the NCore sites when available for a pollutant to be measured, as it is important to have data collected over common time periods for integrated analyses. NCore multipollutant sites are intended to be long-term sites useful for a variety of applications including air quality trends analyses, model evaluation, and tracking metropolitan area statistics. As such, the NCore sites should be placed away from direct emission sources that could substantially impact the ability to detect area-wide concentrations. NCore sites will also supplement other SLAMS sites in reporting to the public in major metropolitan areas. It is not the intent of the NCore sites to monitor in every area where the NAAQS are violated, rather they provide only a subset of the total monitoring effort necessary to accomplish air quality management goals. The total number of monitoring sites that will serve the variety of national, State, and local governmental needs will be substantially higher than these NCore requirements. The Administrator must approve the NCore sites.

(d) Monitoring sites designated as SLAMS sites, but not as NCore sites, are intended to address specific air quality management interests, and as such, are frequently single-pollutant measurement sites. The EPA Regional Administrator must approve the SLAMS sites.

(e) This appendix uses the statistical-based definitions for metropolitan areas provided by the Office of Management and Budget and the Census Bureau. These areas are referred to as metropolitan statistical areas (MSA), micropolitan statistical areas, core-based statistical areas (CBSA), and combined statistical areas (CSA). A CBSA associated with at least one urbanized area of at least 50,000 population is termed a Metropolitan Statistical Area. A CBSA associated with at least one urbanized cluster of at least 10,000 population is termed a Micropolitan Statistical Area. CSA consist of two or more adjacent CBSA. In this appendix, the term MSA is used to refer to a Metropolitan Statistical Area. By definition, both MSA and CSA have a high degree of integration; however, many such areas cross State or other political boundaries. MSA and CSA may also cross more than one air shed. EPA recognizes that State or local agencies must consider MSA/CSA boundaries and their own political boundaries and geographical characteristics in designing their air monitoring networks. EPA recognizes that there may be situations where the EPA Regional Administrator and the affected State or local agencies may need to augment or to divide the overall MSA/CSA monitoring responsibilities and requirements among these various agencies to achieve an effective network design. Full monitoring requirements apply separately to each affected State or local agency in the absence of an agreement between the affected agencies and the EPA Regional Administrator.

3. *Design Criteria for NCore Sites.*

(a) Each State is required to operate one NCore site. States may delegate this requirement to a local agency. States with many MSA often also have multiple air sheds with unique characteristics and, often, elevated air pollution. These States include, at a minimum, California, Florida, Illinois, Michigan, New York, North Carolina, Ohio, Pennsylvania, and Texas. These States are required to identify one to two additional NCore sites in order to account for their unique situations. Any State or local agency can propose additional candidate NCore sites or modifications to these requirements for approval by the Administrator. The NCore locations should be leveraged with other multipollutant air monitoring sites including PAMS sites, NATTS sites, CASTNET sites, and STN sites. Site leveraging includes using the same monitoring platform and equipment to meet the objectives of the variety of programs where possible and advantageous.

(b) The NCore sites must measure, at a minimum, $PM_{2.5}$ particle mass using continuous and integrated/filter-based samplers, speciated $PM_{2.5}$, $PM_{10\text{-}2.5}$ particle mass using continuous samplers, O_3, SO_2, CO, NO/NO_Y wind speed, wind direction, relative humidity, and ambient temperature. EPA recognizes that, in some cases, the physical location of the NCore site may not be suitable for representative meteorological measurements due to the site's physical surroundings. It is also possible that nearby meteorological measurements may be able to fulfill this data need. In these cases, the requirement for meteorological monitoring can be waived by the Administrator.

(c) In addition to the continuous measurements listed above, 10 of the NCore locations (either at the same sites or elsewhere within the MSA/CSA boundary) must also measure lead (Pb). These ten Pb sites are included within the NCore networks because they are intended to be long-term in operation, and not impacted directly from a single lead source. These locations for Pb monitoring must be located in the most populated MSA/CSA in each of the 10 EPA Regions. Alternatively, it is also acceptable to use the Pb concentration data provided at urban air toxics sites. In approving any substitutions, the Administrator must consider whether these alternative sites are suitable for collecting long-term lead trends data for the broader area.

4. *Pollutant-Specific Design Criteria for SLAMS Sites.*

4.1 Ozone (O_3) Design Criteria. (a) State, and where appropriate, local Agencies must operate O_3 sites for various locations depending upon area size (in terms of population and geographic characteristics) and typical peak concentrations (expressed in percentages above, below, or near the O_3 NAAQS). Specific SLAMS O_3 site minimum requirements are included in Table D–2 of this appendix. Typically, most of these required ozone sites will be SLAMS. The NCore sites are expected to compliment the O_3 data collection that takes place at SLAMS sites, and both types of sites can be used to meet the network minimum requirements. The total number of O_3 sites needed to support the basic monitoring objectives of public data reporting, air quality mapping, compliance, and understanding O_3-related atmospheric processes will include more sites than these minimum numbers required in Table D–2 of this appendix. The EPA Regional Administrator and the responsible State or local air monitoring agency must work together to design and/or maintain the most appropriate O_3 network to service the variety of data needs in an area.

TABLE D–2 OF APPENDIX D TO PART 58.—SLAMS MINIMUM O_3 MONITORING REQUIREMENTS

MSA or CSA population[3,5]	Most recent 3-year design value concentrations >115% of any O_3 NAAQS[1]	Most recent 3-year design value concentrations ±15% of any O_3 NAAQS[1]	Most recent 3-year design value concentrations <85% of any O_3 NAAQS[1,2]
>10 million	3	4	2
4–10 million	2	3	1
1–4 million	2	2	1
350,000–1 million	2	2	1
200,000–350,000	1	1	0
50,000–<200,000[4]	1	1	0

[1] The ozone (O_3) National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR part 50.

[2] These minimum monitoring requirements apply in the absence of a design value.

[3] Minimum monitoring requirements apply to the Combined statistical area (CSA) as a whole, if applicable.

[4] Metropolitan statistical areas (MSA) must contain an urbanized area of 50,000 or more population.

[5] Population based on latest available census figures.

(b) At least one O_3 site in each MSA/CSA's O_3 network must be designed to record the maximum concentration for that particular metropolitan area. More than one maximum concentration site may be necessary in some areas. Table D–2 of this appendix does not account for the full breadth of additional factors that would be considered in designing a complete ozone monitoring program for an area. Some of these additional factors include geographic size, population density, complexity of terrain and meteorology, adjacent ozone monitoring programs, air pollution transport from neighboring areas, and measured air quality in comparison to all forms of the O_3 NAAQS (*i.e.*, 8-hour and 1-hour forms). Networks must be designed to account for all of these area characteristics. Network designs must be re-examined in periodic network assessments. Deviations from the above O_3 requirements are allowed if approved by the EPA Regional Administrator.

(c) The appropriate spatial scales for ozone sites are neighborhood, urban, and regional. Since ozone requires appreciable formation time, the mixing of reactants and products occurs over large volumes of air, and this reduces the importance of monitoring small scale spatial variability.

(1) *Neighborhood scale*—Measurements in this category represent conditions throughout some reasonably homogeneous urban subregion, with dimensions of a few kilometers. Homogeneity refers to pollutant concentrations. Neighborhood scale data will provide valuable information for developing, testing, and revising concepts and models that describe urban/regional concentration patterns. These data will be useful to the understanding and definition of processes that take periods of hours to occur and hence involve considerable mixing and transport. Under stagnation conditions, a site located in the neighborhood scale may also experience peak concentration levels within a metropolitan area.

(2) *Urban scale*—Measurement in this scale will be used to estimate concentrations over large portions of an urban area with dimensions of several kilometers to 50 or more kilometers. Such measurements will be used for determining trends, and designing area-wide control strategies. The urban scale sites would also be used to measure high concentrations downwind of the area having the highest precursor emissions.

(3) *Regional scale*—This scale of measurement will be used to typify concentrations over large portions of a metropolitan area and even larger areas with dimensions of as much as hundreds of kilometers. Such measurements will be useful for assessing the ozone that is transported to and from a metropolitan area, as well as background concentrations. In some situations, particularly when considering very large metropolitan areas with complex source mixtures, regional scale sites can be the maximum concentration location.

(d) EPA's technical guidance documents on ozone monitoring network design should be used to evaluate the adequacy of each existing O_3 monitor, to relocate an existing site, or to locate any new O_3 sites.

(e) For locating a neighborhood scale site to measure typical city concentrations, a reasonably homogeneous geographical area near the center of the region should be selected which is also removed from the influence of major NO_X sources. For an urban scale site to measure the high concentration areas, the emission inventories should be used to define the extent of the area of important nonmethane hydrocarbons and NO_X emissions. The meteorological conditions that occur during periods of maximum photochemical activity should be determined. These periods can be identified by examining the meteorological conditions that occur on the highest ozone air quality days. Trajectory analyses, an evaluation of wind and emission patterns on high ozone days, can also be useful in evaluating an ozone monitoring network. In areas without any previous ozone air quality measurements, meteorological and ozone precursor emissions information would be useful.

(f) Once the meteorological and air quality data are reviewed, the prospective maximum concentration monitor site should be selected in a direction from the city that is most likely to observe the highest ozone concentrations, more specifically, downwind during periods of photochemical activity. In many cases, these maximum concentration ozone sites will be located 10 to 30 miles or more downwind from the urban area where maximum ozone precursor emissions originate. The downwind direction and appropriate distance should be determined from historical meteorological data collected on days which show the potential for producing high ozone levels. Monitoring agencies are to consult with their EPA Regional Office when considering siting a maximum ozone concentration site.

(g) In locating a neighborhood scale site which is to measure high concentrations, the same procedures used for the urban scale are followed except that the site should be located closer to the areas bordering on the center city or slightly further downwind in an area of high density population.

(h) For regional scale background monitoring sites, similar meteorological analysis as for the maximum concentration sites may also inform the decisions for locating regional scale sites. Regional scale sites may be located to provide data on ozone transport between cities, as background sites, or for other data collection purposes. Consideration of both area characteristics, such as meteorology, and the data collection objectives, such as transport, must be jointly considered for a regional scale site to be useful.

(i) Since ozone levels decrease significantly in the colder parts of the year in many areas, ozone is required to be monitored at SLAMS monitoring sites only during the ''ozone season'' as designated in the AQS files on a State-by-State basis and described below in Table D–3 of this appendix. Deviations from the ozone monitoring season must be approved by the EPA Regional Administrator, documented within the annual monitoring network plan, and updated in AQS. Information on how to analyze ozone data to support a change to the ozone season in support of the 8-hour standard for a specific State can be found in reference 8 to this appendix.

TABLE D–3 TO APPENDIX D OF PART 58.—OZONE MONITORING SEASON BY STATE

State	Begin month	End month
Alabama	March	October.
Alaska	April	October.
Arizona	January	December.
Arkansas	March	November.
California	January	December.
Colorado	March	September.
Connecticut	April	September.
Delaware	April	October.
District of Columbia	April	October.
Florida	March	October.
Georgia	March	October.
Hawaii	January	December.
Idaho	May	September.
Illinois	April	October.
Indiana	April	September.
Iowa	April	October.
Kansas	April	October.
Kentucky	March	October.
Louisiana AQCR 019,022	March	October.
Louisiana AQCR 106	January	December.
Maine	April	September.
Maryland	April	October.
Massachusetts	April	September.
Michigan	April	September.
Minnesota	April	October.
Mississippi	March	October.
Missouri	April	October.
Montana	June	September.
Nebraska	April	October.
Nevada	January	December.
New Hampshire	April	September.
New Jersey	April	October.
New Mexico	January	December.
New York	April	October.
North Carolina	April	October.
North Dakota	May	September.
Ohio	April	October.
Oklahoma	March	November.
Oregon	May	September.
Pennsylvania	April	October.
Puerto Rico	January	December.
Rhode Island	April	September.
South Carolina	April	October.
South Dakota	June	September.
Tennessee	March	October.
Texas AQCR 106,153, 213, 214, 216	January	December.
Texas AQCR 022, 210, 211, 212, 215, 217, 218	March	October.
Utah	May	September.
Vermont	April	September.
Virginia	April	October.
Washington	May	September.
West Virginia	April	October.
Wisconsin	April 15	October 15.
Wyoming	April	October.
American Samoa	January	December.
Guam	January	December.
Virgin Islands	January	December.

4.2 Carbon Monoxide (CO) Design Criteria. (a) There are no minimum requirements for the number of CO monitoring sites. Continued operation of existing SLAMS CO sites using FRM or FEM methods is required until discontinuation is approved by the EPA Regional Administrator. Where SLAMS CO monitoring is required, at least one site must be a maximum concentration site for that area under investigation.

(b) Microscale and middle scale measurements are useful site classifications for SLAMS sites since most people have the potential for exposure on these scales. Carbon monoxide maxima occur primarily in areas near major roadways and intersections with high traffic density and often poor atmospheric ventilation.

(1) *Microscale*—This scale applies when air quality measurements are to be used to represent distributions within street canyons, over sidewalks, and near major roadways. In the case with carbon monoxide, microscale measurements in one location can often be considered as representative of other similar locations in a city.

(2) *Middle scale*—Middle scale measurements are intended to represent areas with dimensions from 100 meters to 0.5 kilometer. In certain cases, middle scale measurements may apply to areas that have a total length of several kilometers, such as ‘‘line’’ emission source areas. This type of emission sources areas would include air quality along a commercially developed

street or shopping plaza, freeway corridors, parking lots and feeder streets.

(c) After the spatial scale and type of site has been determined to meet the monitoring objective for each location, the technical guidance in reference 2 of this appendix should be used to evaluate the adequacy of each existing CO site and must be used to relocate an existing site or to locate any new sites.

4.3 Nitrogen Dioxide (NO_2) Design Criteria. (a) There are no minimum requirements for the number of NO_2 monitoring sites. Continued operation of existing SLAMS NO_2 sites using FRM or FEM methods is required until discontinuation is approved by the EPA Regional Administrator. Where SLAMS NO_2 monitoring is required, at least one NO_2 site in the area must be located to measure the maximum concentration of NO_2.

(b) NO/NO_Y measurements are included within the NCore multipollutant site requirements and the PAMS program. These NO/NO_Y measurements will produce conservative estimates for NO_2 that can be used to track continued compliance with the NO_2 NAAQS. NO/NO_Y monitors are used at these sites because it is important to collect data on total reactive nitrogen species for understanding ozone photochemistry.

4.4 Sulfur Dioxide (SO_2) Design Criteria. (a) There are no minimum requirements for the number of SO_2 monitoring sites. Continued operation of existing SLAMS SO_2 sites using FRM or FEM methods is required until discontinuation is approved by the EPA Regional Administrator. Where SLAMS SO_2 monitoring is required, at least one of the SLAMS SO_2 sites must be a maximum concentration site for that specific area.

(b) The appropriate spatial scales for SO_2 SLAMS monitoring are the microscale, middle, and possibly neighborhood scales. The multi-pollutant NCore sites can provide for metropolitan area trends analyses and general control strategy progress tracking. Other SLAMS sites are expected to provide data that are useful in specific compliance actions, for maintenance plan agreements, or for measuring near specific stationary sources of SO_2.

(1) *Micro and middle scale*—Some data uses associated with microscale and middle scale measurements for SO_2 include assessing the effects of control strategies to reduce concentrations (especially for the 3-hour and 24-hour averaging times) and monitoring air pollution episodes.

(2) *Neighborhood scale*—This scale applies where there is a need to collect air quality data as part of an ongoing SO_2 stationary source impact investigation. Typical locations might include suburban areas adjacent to SO_2 stationary sources for example, or for determining background concentrations as part of these studies of population responses to exposure to SO_2.

(c) Technical guidance in reference 1 of this appendix should be used to evaluate the adequacy of each existing SO_2 site, to relocate an existing site, or to locate new sites.

4.5 Lead (Pb) Design Criteria. (a) State, and where appropriate, local agencies are required to conduct Pb monitoring for all areas where Pb levels have been shown or are expected to be of concern over the most recent 2 years. As a minimum, there must be two SLAMS sites in any area where Pb concentrations currently exceed or have exceeded the Pb NAAQS in the most recent 2 years, and at least one of these two required sites must be a maximum concentration site. Where the Pb air quality violations are widespread or the emissions density, topography, or population locations are complex and varied, the EPA Regional Administrator may require more than two Pb ambient air monitoring sites.

(b) The most important spatial scales to effectively characterize the emissions from point sources are the micro, middle, and neighborhood scales.

(1) *Microscale*—This scale would typify areas in close proximity to lead point sources. Emissions from point sources such as primary and secondary lead smelters, and primary copper smelters may under fumigation conditions likewise result in high ground level concentrations at the microscale. In the latter case, the microscale would represent an area impacted by the plume with dimensions extending up to approximately 100 meters. Data collected at microscale sites provide information for evaluating and developing ''hot-spot'' control measures.

(2) *Middle scale*—This scale generally represents Pb air quality levels in areas up to several city blocks in size with dimensions on the order of approximately 100 meters to 500 meters. The middle scale may for example, include schools and playgrounds in center city areas which are close to major Pb point sources. Pb monitors in such areas are desirable because of the higher sensitivity of children to exposures of elevated Pb concentrations (reference 3 of this appendix). Emissions from point sources frequently impact on areas at which single sites may be located to measure concentrations representing middle spatial scales.

(3) *Neighborhood scale*—The neighborhood scale would characterize air quality conditions throughout some relatively uniform land use areas with dimensions in the 0.5 to 4.0 kilometer range. Sites of this scale would provide monitoring data in areas representing conditions where children live and play. Monitoring in such areas is important since this segment of the population is more susceptible to the effects of Pb. Where a neighborhood site is located away from immediate Pb sources, the site may be very useful in representing typical air quality values for a larger residential area, and therefore suitable for population exposure and trends analyses.

(c) Technical guidance is found in references 4 and 5 of this appendix. These documents provide additional guidance on locating sites to meet specific urban area monitoring objectives and should be used in locating new sites or evaluating the adequacy of existing sites.

4.6 Particulate Matter (PM_{10}) Design Criteria. (a) There are no minimum requirements for the number of PM_{10} monitoring sites. In areas where the PM_{10} NAAQS has not been revoked, continued operation of existing SLAMS PM_{10} sites using FRM or FEM methods is required until discontinuation is approved by the EPA Regional Administrator. In areas for where the PM_{10} NAAQS has been revoked, there is no requirement for continued operation of existing sites.

(b) The most important spatial scales to effectively characterize the emissions of PM_{10} from both mobile and stationary sources are the middle scales and neighborhood scales. For purposes of establishing monitoring sites to represent large homogenous areas other than the above scales of representativeness and to characterize regional transport, urban or regional scale sites would also be needed.

(1) *Microscale*—This scale would typify areas such as downtown street canyons, traffic corridors, and fence line stationary source monitoring locations where the general public could be exposed to maximum PM_{10} concentrations. Microscale particulate matter sites should be located near inhabited buildings or locations where the general public can be expected to be exposed to the concentration measured. Emissions from stationary sources such as primary and secondary smelters, power plants, and other large industrial processes may, under certain plume conditions, likewise result in high ground level concentrations at the microscale. In the latter case, the microscale would represent an area impacted by the plume with dimensions extending up to approximately 100 meters. Data collected at microscale sites provide information for evaluating and developing hot spot control measures.

(2) *Middle scale*—Much of the short-term public exposure to coarse fraction particles (PM_{10}) is on this scale and on the neighborhood scale. People moving through downtown areas or living near major roadways or stationary sources, may encounter particulate pollution that would be adequately characterized by measurements of this spatial scale. Middle scale PM_{10} measurements can be appropriate for the evaluation of possible short-term exposure public health effects. In many situations, monitoring sites that are representative of micro-scale or middle-scale impacts are not unique and are representative of many similar situations. This can occur along traffic corridors or other locations in a residential district. In this case, one location is representative of a neighborhood of small scale sites and is appropriate for evaluation of long-term or chronic effects. This scale also includes the characteristic concentrations for other areas with dimensions of a few hundred meters such as the parking lot and feeder streets associated with shopping centers, stadia, and office buildings. In the case of PM_{10}, unpaved or seldomly swept parking lots associated with these sources could be an important source in addition to the vehicular emissions themselves.

(3) *Neighborhood scale*—Measurements in this category represent conditions throughout some reasonably homogeneous urban subregion with dimensions of a few kilometers and of generally more regular shape than the middle scale. Homogeneity refers to the particulate matter concentrations, as well as the land use and

land surface characteristics. In some cases, a location carefully chosen to provide neighborhood scale data would represent not only the immediate neighborhood but also neighborhoods of the same type in other parts of the city. Neighborhood scale PM$_{10}$ sites provide information about trends and compliance with standards because they often represent conditions in areas where people commonly live and work for extended periods. Neighborhood scale data could provide valuable information for developing, testing, and revising models that describe the larger-scale concentration patterns, especially those models relying on spatially smoothed emission fields for inputs. The neighborhood scale measurements could also be used for neighborhood comparisons within or between cities.

(4) *Urban scale*—This class of measurement would be made to characterize the particulate matter concentration over an entire metropolitan or rural area ranging in size from 4 to 50 kilometers. Such measurements would be useful for assessing trends in area-wide air quality, and hence, the effectiveness of large scale air pollution control strategies.

(5) *Regional scale*—These measurements would characterize conditions over areas with dimensions of as much as hundreds of kilometers. As noted earlier, using representative conditions for an area implies some degree of homogeneity in that area. For this reason, regional scale measurements would be most applicable to sparsely populated areas. Data characteristics of this scale would provide information about larger scale processes of particulate matter emissions, losses and transport.

4.7 Fine Particulate Matter (PM$_{2.5}$) Design Criteria.

4.7.1 General Requirements. (a) State, and where applicable local, agencies must operate the minimum number of required PM$_{2.5}$ SLAMS sites listed in Table D–4 of this appendix. The NCore sites are expected to complement the PM$_{2.5}$ data collection that takes place at non-NCore SLAMS sites, and both types of sites can be used to meet the minimum PM$_{2.5}$ network requirements. Deviations from these PM$_{2.5}$ monitoring requirements must be approved by the EPA Regional Administrator.

TABLE D–4 OF APPENDIX D TO PART 58.—PM$_{2.5}$ MINIMUM MONITORING REQUIREMENTS

MSA or CSA population[3, 5]	Most recent 3-year design value ≥115% of any PM$_{2.5}$ NAAQS[1]	Most recent 3-year design value ±15% of PM$_{2.5}$ NAAQS[1]	Most recent 3-year design value ≤85% of any PM$_{2.5}$ NAAQS[1 2]
> 1,000,000	2	3	2
500,000–1,000,000	1	2	1
250,000–500,000	1	1	0
100,000–250,000	1	1	0
50,000–<100,000[4]	1	1	0

[1] The PM$_{2.5}$ National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR part 50.
[2] These minimum monitoring requirements apply in the absence of a design value.
[3] Minimum monitoring requirements apply to the Combined statistical area (CSA) as a whole, where applicable.
[4] Metropolitan statistical areas (MSA) must contain an urbanized area of 50,000 or more population.
[5] Population based on latest available census figures.

(b) The technical guidance in references 6 and 7 of this appendix should be used for siting PM$_{2.5}$ monitors.

(c) The most important spatial scale to effectively characterize the emissions of particulate matter from both mobile and stationary sources is the neighborhood scale for PM$_{2.5}$. For purposes of establishing monitoring sites to represent large homogenous areas other than the above scales of representativeness and to characterize regional transport, urban or regional scale sites would also be needed. Most PM$_{2.5}$ monitoring in urban areas should be representative of a neighborhood scale.

(1) *Microscale*—This scale would typify areas such as downtown street canyons and traffic corridors where the general public would be exposed to maximum concentrations from mobile sources. In some circumstances, the microscale is appropriate for particulate sites; community-oriented SLAMS sites measured at the microscale level should, however, be limited to urban sites that are representative of long-term human exposure and of many such microenvironments in the area. In general, microscale particulate matter sites should be located near inhabited buildings or locations where the general public can be expected to be exposed to the concentration measured. Emissions from stationary sources such as primary and secondary smelters, power plants, and other large industrial processes may, under certain plume conditions, likewise result in high ground level concentrations at the microscale. In the latter case, the microscale would represent an area impacted by the plume with dimensions extending up to approximately 100 meters. Data collected at microscale sites provide information for evaluating and developing hot spot control measures. Unless these sites are indicative of population-oriented monitoring, they may be more appropriately classified as special purpose monitors (SPMs). Microscale PM$_{2.5}$ sites would be excluded from comparison with the annual PM$_{2.5}$ NAAQS in accordance with § 58.30(a)(1).

(2) *Middle scale*—People moving through downtown areas, or living near major roadways, encounter particle concentrations that would be adequately characterized by this spatial scale. Thus, measurements of this type would be appropriate for the evaluation of possible short-term exposure public health effects of particulate matter pollution. In many situations, monitoring sites that are representative of microscale or middle-scale impacts are not unique and are representative of many similar situations. This can occur along traffic corridors or other locations in a residential district. In this case, one location is representative of a number of small scale sites and is appropriate for evaluation of long-term or chronic effects. This scale also includes the characteristic concentrations for other areas with dimensions of a few hundred meters such as the parking lot and feeder streets associated with shopping centers, stadia, and office buildings.

(3) *Neighborhood scale*—Measurements in this category would represent conditions throughout some reasonably homogeneous urban subregion with dimensions of a few kilometers and of generally more regular shape than the middle scale. Homogeneity refers to the particulate matter concentrations, as well as the land use and land surface characteristics. Much of the PM$_{2.5}$ exposures are expected to be associated with this scale of measurement. In some cases, a location carefully chosen to provide neighborhood scale data would represent the immediate neighborhood as well as neighborhoods of the same type in other parts of the city. PM$_{2.5}$ sites of this kind provide good information about trends and compliance with standards because they often represent conditions in areas where people commonly live and work for periods comparable to those specified in the NAAQS. In general, most PM$_{2.5}$ monitoring in urban areas should have this scale.

(4) *Urban scale*—This class of measurement would be used to characterize the particulate matter concentration over an entire metropolitan or rural area ranging in size from 4 to 50 kilometers. Such measurements would be useful for assessing trends in area-wide air quality, and hence, the effectiveness of large scale air pollution control strategies. Community-oriented PM$_{2.5}$ sites may have this scale.

(5) *Regional scale*—These measurements would characterize conditions over areas with dimensions of as much as hundreds of kilometers. As noted earlier, using representative conditions for an area implies some degree of homogeneity in that area. For

this reason, regional scale measurements would be most applicable to sparsely populated areas. Data characteristics of this scale would provide information about larger scale processes of particulate matter emissions, losses and transport. $PM_{2.5}$ transport contributes to elevated particulate concentrations and may affect multiple urban and State entities with large populations such as in the eastern United States. Development of effective pollution control strategies requires an understanding at regional geographical scales of the emission sources and atmospheric processes that are responsible for elevated $PM_{2.5}$ levels and may also be associated with elevated ozone and regional haze.

4.7.2 Requirement for Continuous $PM_{2.5}$ Monitoring. State, or where appropriate, local agencies must operate continuous fine particulate analyzers at one-half (round up) of the minimum required sites listed in Table D–4 of this appendix. State and local air monitoring agencies must use methodologies and quality assurance/quality control (QA/QC) procedures approved by the EPA Regional Administrator for these sites.

4.7.3 Requirement for $PM_{2.5}$ Background and Transport Sites. Each State shall install and operate at least one $PM_{2.5}$ site to monitor for regional background and at least one $PM_{2.5}$ site to monitor regional transport. These monitoring sites may be at community-oriented sites and this requirement may be satisfied by a corresponding monitor in an area having similar air quality in another State. State and local air monitoring agencies must use methodologies and QA/QC procedures approved by the EPA Regional Administrator for these sites. Methods used at these sites may include non-federal reference method samplers such as IMPROVE or continuous $PM_{2.5}$ monitors.

4.7.4 $PM_{2.5}$ Chemical Speciation Site Requirements. Each State shall continue to conduct chemical speciation monitoring and analyses at sites designated to be part of the $PM_{2.5}$ Speciation Trends Network (STN). The selection and modification of these STN sites must be approved by the Administrator. The $PM_{2.5}$ chemical speciation urban trends sites shall include analysis for elements, selected anions and cations, and carbon. Samples must be collected using the monitoring methods and the sampling schedules approved by the Administrator. Chemical speciation is encouraged at additional sites where the chemically resolved data would be useful in developing State implementation plans and supporting atmospheric or health effects related studies.

4.7.5 Special Network Considerations Required When Using $PM_{2.5}$ Spatial Averaging Approaches. (a) The $PM_{2.5}$ NAAQS, specified in 40 CFR 50, provides State and local air monitoring agencies with an option for spatially averaging $PM_{2.5}$ air quality data. More specifically, two or more community-oriented (*i.e.*, sites in populated areas) $PM_{2.5}$ monitors may be averaged for comparison with the annual $PM_{2.5}$ NAAQS. This averaging approach is directly related to epidemiological studies used as the basis for the $PM_{2.5}$ annual NAAQS. Spatial averaging does not apply to comparisons with the daily $PM_{2.5}$ NAAQS.

(b) State and local agencies must carefully consider their approach for $PM_{2.5}$ network design when they intend to spatially average the data for compliance purposes. These State and local air monitoring agencies must define the area over which they intend to average $PM_{2.5}$ air quality concentrations. This area is defined as a Community Monitoring Zone (CMZ), which characterizes an area of relatively similar annual average air quality. State and local agencies can define a CMZ in a number of ways, including as part or all of a metropolitan area. These CMZ must be defined within a State or local agencies network description, as required in § 58.10 of this part and approved by the EPA Regional Administrator. When more than one CMZ is described within an agency's network design plan, CMZs must not overlap in their geographical coverage. The criteria that must be used for evaluating the acceptability of spatial averaging are defined in Appendix N of 40 CFR Part 50.

4.8 Coarse Particulate Matter ($PM_{10\text{-}2.5}$) Design Criteria.

4.8.1 General Monitoring Requirements. (a) Consistent with the indicator for the proposed $PM_{10\text{-}2.5}$ NAAQS, required $PM_{10\text{-}2.5}$ monitoring will address areas where the mix of $PM_{10\text{-}2.5}$ is dominated by resuspended dust from high-density traffic on paved roads and PM generated by industrial sources and construction sources, and will not address areas where it is dominated by rural windblown dust and soils and PM generated by agricultural and mining sources.

(b) State, and where applicable, local Agencies must operate, at a minimum, the number of required $PM_{10\text{-}2.5}$ SLAMS sites listed in Table D–5 of this appendix. The minimum requirements of Table D–5 apply only to MSAs that contain all or part of an urbanized area with a population of at least 100,000 persons. NCore sites are expected to complement the $PM_{10\text{-}2.5}$ data collection that takes place at SLAMS Sites. Data from urban NCore sites can be used to meet minimum $PM_{10\text{-}2.5}$ network requirements if those sites meet the NAAQS comparability criteria in § 58.30(b). Modifications from the $PM_{10\text{-}2.5}$ monitoring requirements must be approved by the Regional Administrator.

TABLE D–5 OF APPENDIX D TO PART 58.—$PM_{10\text{-}2.5}$ MINIMUM MONITORING REQUIREMENTS

MSA population [1, 5]	Most recent 3-year design value [2] ≥80% of $PM_{10\text{-}2.5}$ NAAQS [3]	Most recent 3-year design value 50%–80% of $PM_{10\text{-}2.5}$ NAAQS [3 4]	Most recent 3-year design value <50% of $PM_{10\text{-}2.5}$ NAAQS [3]
>5,000,000	5	3	2
1,000,000–<5,000,000	4	2	1
500,000–<1,000,000	3	1	0
100,000–<500,000	2	1	0

[1] Metropolitan Statistical Area (MSA) as defined by the Office of Management of Budget. The minimum requirements of this table apply only to MSAs that contain all or part of an urbanized area with a population of at least 100,000 persons. Multiple MSA in a Combined statistical area (CSA) are separately subject to these requirements based on their population and design value.

[2] A database of estimated $PM_{10\text{-}2.5}$ design values will be provided by EPA until the network is fully deployed for three years. States may propose alternate estimates for EPA Regional Administrator approval.

[3] The $PM_{10\text{-}2.5}$ National Ambient Air Quality Standards (NAAQS) levels and forms are defined in part 50 of this chapter.

[4] These minimum monitoring requirements apply in the absence of a design value.

[5] Population based on latest available census figures.

(c) Middle and neighborhood scale measurements are the most important station classifications for $PM_{10\text{-}2.5}$ to assess the variation in coarse particle concentrations that would be expected across populated areas that are in proximity to large emissions sources. Sites that represent larger spatial scales would characterize concentrations in the suburban, highly populated areas of larger MSA's that are more distant from the zones of most concentrated industrial activity.

(1) *Microscale*—This scale would typify relatively small areas immediately adjacent to: Industrial sources; locations experiencing ongoing construction, redevelopment, and soil disturbance; and heavily traveled roadways. Data collected at microscale stations would characterize exposure over areas of limited spatial extent and population exposure, and may provide information useful for evaluating and developing source-oriented control measures. Microscale sites would be excluded from comparison with the NAAQS in accordance with § 58.30(b)(4), and may be more appropriately classified as SPMs.

(2) *Middle scale*—People living or working near major roadways or industrial districts encounter particle concentrations that would

be adequately characterized by this spatial scale. Thus, measurements of this type would be appropriate for the evaluation of public health effects of coarse particle exposure. Monitors located in populated areas that are nearly adjacent to large industrial point sources of coarse particles provide suitable locations for assessing maximum population exposure levels and identifying areas of potentially poor air quality. Similarly, monitors located in populated areas that border dense networks of heavily-traveled traffic are appropriate for assessing the impacts of resuspended road dust. This scale also includes the characteristic concentrations for other areas with dimensions of a few hundred meters such as school grounds and parks that are nearly adjacent to major roadways and industrial point sources, locations exhibiting mixed residential and commercial development, and downtown areas featuring office buildings, shopping centers, and stadiums.

(3) *Neighborhood scale*—Measurements in this category would represent conditions throughout some reasonably homogeneous urban subregion with dimensions of a few kilometers and of generally more regular shape than the middle scale. Homogeneity refers to the particulate matter concentrations, as well as the land use and land surface characteristics. This category includes suburban neighborhoods dominated by residences that are somewhat distant from major roadways and industrial districts but still impacted by urban sources, and areas of diverse land use where residences are interspersed with commercial and industrial neighborhoods. In some cases, a location carefully chosen to provide neighborhood scale data would represent the immediate neighborhood as well as neighborhoods of the same type in other parts of the city. The comparison of data from middle scale and neighborhood scale sites would provide valuable information for determining the variation of $PM_{10-2.5}$ levels across urban areas and assessing the spatial extent of elevated concentrations caused by major industrial point sources and heavily traveled roadways. Neighborhood scale sites would provide concentration data that are relevant to informing a large segment of the population of their exposure levels on a given day.

4.8.2 $PM_{10-2.5}$ Specific Siting Requirements.

4.8.2.1 A minimum of 50 percent of the $PM_{10-2.5}$ sites required in Table D–5 of this appendix must characterize middle scale-sized areas (values of 0.5 monitors and greater round up). Middle-scale sites must be situated in areas of expected maximum concentration among sites eligible for comparison to the NAAQS.

4.8.2.2 For those areas with monitoring requirements greater than one required monitor, at least one of the required monitors must be at a population-oriented site in a neighborhood scale-sized area that is highly populated and which may be somewhat further away from emission sources than the required middle-scale sites, subject to the requirement that the site must meet the comparability criteria in § 58.30(b). Among such sites, the State should select a site characterized by a large number of people subject to exposure; typically, this population number would be higher than the population at middle-scale sites expected to record maximum concentrations.

4.8.2.3 For MSA's with a requirement for four or five monitors, the siting of the remaining unspecified monitor is left to the discretion of the State or local monitoring agency, subject to the requirement that the site must meet the comparability criteria in § 58.30(b). This site could be placed in middle-scale or neighborhood scale locations similar to those that would be eligible as monitoring sites for the other required monitors. A State may also choose to place the site in a location that is somewhat more distant from downtown areas, main industrial source regions, or areas of highest traffic density, such as in a suburban residential community.

4.8.3 $PM_{10-2.5}$ Chemical Speciation Site Requirements. One chemical speciation monitoring site is required in each MSA with total population over 500,000 people that also has an estimated $PM_{10-2.5}$ design value greater than 80% of the NAAQS. These sites will gather data in areas that have a higher probability of exceeding the proposed NAAQS and also have larger exposed populations at risk, and will support the characterization of coarse particles concentrations that control the attainment/nonattainment status of the area. Samples must be collected using monitoring methods and the sampling schedules approved by the EPA Regional Administrator. Chemical speciation is encouraged at additional sites to support development of State implementation plans and atmospheric or health effects related studies. These additional locations may include STN, NCore, CASTNET, and IMPROVE sites to provide coverage of sources typical of urban core locations, suburban regions typified by predominantly residential districts, and less densely-settled rural locations that may be characterized by naturally occurring geologic materials. The selection and modification of $PM_{10-2.5}$ chemical speciation sites must be approved by the EPA Regional Administrator.

4.9 Filter Archive Requirements for $PM_{2.5}$, PM_{10}, and $PM_{10-2.5}$. Air pollution control agencies shall archive $PM_{2.5}$, PM_{10}, and $PM_{10-2.5}$ filters from all SLAMS sites for 1 year after collection. These filters shall be made available during the course of that year for supplemental analyses at the request of EPA or to provide information to State and local agencies on $PM_{2.5}$ composition. Other Federal Agencies may request access to filters for purposes of supporting air quality management or community health—such as biological assay—through the applicable EPA Regional Administrator. The filters shall be archived according to procedures approved by the Administrator. EPA recommends that particulate matter filters be archived for longer periods, especially for key sites in making NAAQS related decisions or for supporting health-related air pollution studies.

5. *Network Design for Photochemical Assessment Monitoring Stations (PAMS).*

The PAMS program provides more comprehensive data on O_3 air pollution in areas classified as serious, severe, or extreme nonattainment for ozone than would otherwise be achieved through the NCore and SLAMS sites. More specifically, the PAMS program includes measurements for ozone, oxides of nitrogen, volatile organic compounds, and meteorology.

5.1 PAMS Monitoring Objectives. PAMS design criteria are site specific. Concurrent measurements of O_3, oxides of nitrogen, speciated VOC, CO, and meteorology are obtained at PAMS sites. Design criteria for the PAMS network are based on locations relative to O_3 precursor source areas and predominant wind directions associated with high O_3 events. Specific monitoring objectives are associated with each location. The overall design should enable characterization of precursor emission sources within the area, transport of O_3 and its precursors, and the photochemical processes related to O_3 nonattainment. Specific objectives that must be addressed include assessing ambient trends in O_3, oxides of nitrogen, VOC species, and determining spatial and diurnal variability of O_3, oxides of nitrogen, and VOC species. Specific monitoring objectives associated with each of these sites may result in four distinct site types. Detailed guidance for the locating of these sites may be found in reference 9 of this appendix.

(a) Type 1 sites are established to characterize upwind background and transported O_3 and its precursor concentrations entering the area and will identify those areas which are subjected to transport.

(b) Type 2 sites are established to monitor the magnitude and type of precursor emissions in the area where maximum precursor emissions are expected to impact and are suited for the monitoring of urban air toxic pollutants.

(c) Type 3 sites are intended to monitor maximum O_3 concentrations occurring downwind from the area of maximum precursor emissions.

(d) Type 4 sites are established to characterize the downwind transported O_3 and its precursor concentrations exiting the area and will identify those areas which are potentially contributing to overwhelming transport in other areas.

5.2 Monitoring Period. PAMS precursor monitoring must be conducted annually throughout the months of June, July and August (as a minimum) when peak O_3 values are expected in each area. Alternate precursor monitoring periods may be submitted for approval to the Administrator as a part of the annual monitoring network plan required by § 58.10.

5.3 Minimum Monitoring Network Requirements. A Type 2 site is required for each area. Overall, only two sites are required for each area, providing all chemical measurements are made. For example, if a design includes two Type 2 sites, then a third site will be necessary to capture the NO_y measurement. The minimum required number and type of monitoring sites and sampling requirements are listed in Table D–6 of this appendix. Any alternative plans may be put in place in lieu of these requirements, if approved by the Administrator.

TABLE D–6 OF APPENDIX D TO PART 58.—MINIMUM REQUIRED PAMS MONITORING LOCATIONS AND FREQUENCIES

Measurement	Where required	Sampling frequency (all daily except for upper air meteorology)[1]
Speciated VOC[2]	Two sites per area, one of which must be a Type 2 site	During the PAMS monitoring period: (1) Hourly auto GC, or (2) Eight 3-hour canisters, or (3) 1 morning and 1 afternoon canister with a 3-hour or less averaging time plus Continuous Total Non-methane Hydrocarbon measurement.
Carbonyl Sampling	Type 2 site in areas classified as serious or above for the 8-hour ozone standard.	3-hour samples every day during the PAMS monitoring period.
NO_X	All Type 2 sites	Hourly during the ozone monitoring season.[3]
NO_Y	One site per area at the Type 3 or Type 1 site	Hourly during the ozone monitoring season.
CO (ppb level)	One site per area at a Type 2 site	Hourly during the ozone monitoring season.
Ozone	All sites	Hourly during the ozone monitoring season.
Surface met	All sites	Hourly during the ozone monitoring season.
Upper air meteorology	One representative location within PAMS area	Sampling frequency must be approved as part of the PAMS Network Description described in 40 CFR 58.41.

[1] Daily or with an approved alternative plan.

[2] Speciated VOC is defined in the "Technical Assistance Document for Sampling and Analysis of Ozone Precursors", EPA/600–R–98/161, September 1998.

[3] Approved ozone monitoring season as stipulated in 40 CFR part 58, Table D–3 of this appendix.

5.4 Transition Period. A transition period is allowed for phasing in the operation of newly required PAMS programs (due generally to reclassification of an area into serious, severe, or extreme nonattainment for ozone). Following the date of redesignation or reclassification of any existing O_3 nonattainment area to serious, severe, or extreme, or the designation of a new area and classification to serious, severe, or extreme O_3 nonattainment, a State is allowed one year to develop plans for its PAMS implementation strategy. Subsequently, a minimum of one Type 2 site must be operating by the first month of the following approved PAMS season. Operation of the remaining site(s) must, at a minimum, be phased in at the rate of one site per year during subsequent years as outlined in the approved PAMS network description provided by the State.

6. *References.*

1. Ball, R.J. and G. E. Anderson. Optimum Site Exposure Criteria for SO_2 Monitoring. The Center for the Environment and Man, Inc., Hartford, CT. Prepared for U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA Publication No. EPA–450/3–77–013. April 1977.

2. Ludwig, F.F., J.H.S. Kealoha, and E. Shelar. Selecting Sites for Carbon Monoxide Monitoring. Stanford Research Institute, Menlo Park, CA. Prepared for U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA Publication No. EPA–450/3–75–077, September 1975.

3. Air Quality Criteria for Lead. Office of Research and Development, U.S. Environmental Protection Agency, Washington, DC. EPA Publication No. 600/8–89–049F. August 1990. (NTIS document numbers PB87–142378 and PB91–138420.)

4. Optimum Site Exposure Criteria for Lead Monitoring. PEDCo Environmental, Inc. Cincinnati, OH. Prepared for U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA Contract No. 68–02–3013. May 1981.

5. Guidance for Conducting Ambient Air Monitoring for Lead Around Point Sources. Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA–454/R–92–009. May 1997.

6. Koch, R.C. and H.E. Rector. Optimum Network Design and Site Exposure Criteria for Particulate Matter. GEOMET Technologies, Inc., Rockville, MD. Prepared for U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA Contract No. 68–02–3584. EPA 450/4–87–009. May 1987.

7. Watson *et al.* Guidance for Network Design and Optimum Site Exposure for $PM_{2.5}$ and PM_{10}. Prepared for U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA–454/R–99–022, December 1997.

8. Guideline for Selecting and Modifying the Ozone Monitoring Season Based on an 8-Hour Ozone Standard. Prepared for U.S. Environmental Protection Agency, RTP, NC. EPA–454/R–98–001, June 1998.

9. Photochemical Assessment Monitoring Stations Implementation Manual. Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA–454/B–93–051. March 1994.

52. Appendix E to part 58 is revised to read as follows:

Appendix E to Part 58—Probe and Monitoring Path Siting Criteria for Ambient Air Quality Monitoring

1. Introduction.
2. Horizontal and Vertical Placement.
3. Spacing from Minor Sources.
4. Spacing From Obstructions.
5. Spacing From Trees.
6. Spacing From Roadways.
7. Cumulative Interferences on a Monitoring Path.
8. Maximum Monitoring Path Length.
9. Probe Material and Pollutant Sample Residence Time.
10. Waiver Provisions.
11. Summary.
12. References.

1. *Introduction.*

(a) This appendix contains specific location criteria applicable to SLAMS, NCore, and PAMS ambient air quality monitoring probes, inlets, and optical paths after the general location has been selected based on the monitoring objectives and spatial scale of representation discussed in appendix D to this part. Adherence to these siting criteria is necessary to ensure the uniform collection of compatible and comparable air quality data.

(b) The probe and monitoring path siting criteria discussed in this appendix must be followed to the maximum extent possible. It is recognized that there may be situations where some deviation from the siting criteria may be necessary. In any such case, the reasons must be thoroughly documented in a written request for a waiver that describes how and why the proposed siting deviates from the criteria. This documentation should help to avoid later questions about the validity of the resulting monitoring data. Conditions under which the EPA would consider an application for waiver from these siting criteria are discussed in section 11 of this appendix.

(c) The pollutant-specific probe and monitoring path siting criteria generally apply to all spatial scales except where noted otherwise. Specific siting criteria that are phrased with a "must" are defined as requirements and exceptions must be approved through the waiver provisions. However, siting criteria that are phrased with a "should" are defined as goals to meet for consistency but are not requirements.

2. *Horizontal and Vertical Placement.*

The probe or at least 80 percent of the monitoring path must be located between 2 and 15 meters above ground level for all ozone, sulfur dioxide and nitrogen dioxide monitoring sites, and for neighborhood scale Pb, PM_{10}, $PM_{10\text{-}2.5}$, $PM_{2.5}$, and carbon monoxide sites. Middle scale $PM_{10\text{-}2.5}$ sites are required to have sampler inlets between 2 and 7 meters above ground level. Microscale Pb, PM_{10}, and $PM_{2.5}$ sites are required to have sampler inlets between 2 and 7 meters above ground level. The inlet probes for microscale carbon monoxide monitors that are being used to measure concentrations near roadways must be 3±½ meters above ground level. The probe or at least 90 percent of the monitoring path must be at least 1 meter vertically or horizontally away from any supporting structure, walls, parapets, penthouses, etc., and away from dusty or dirty areas. If the probe or a significant portion of the monitoring path is located near the side of a building, then it should be located on the windward side of the building relative to the prevailing wind direction during the season of highest concentration potential for the pollutant being measured.

3. *Spacing from Minor Sources.*

(a) It is important to understand the monitoring objective for a particular location in order to interpret this particular requirement. Local minor sources of a primary pollutant, such as SO_2, lead, or particles, can cause high concentrations of that particular pollutant at a monitoring site. If the objective for that monitoring site is to investigate these local primary pollutant emissions, then the site is likely to be properly located nearby. This type of monitoring site would in all likelihood be a microscale type of monitoring site. If a monitoring site is to be used to determine air quality over a much larger area, such as a neighborhood or city, a monitoring agency should avoid placing a monitor probe, path, or inlet near local, minor sources. The plume from the local minor sources should not be allowed to inappropriately impact the air quality data collected at a site. Particulate matter sites should not be located in an unpaved area unless there is vegetative ground cover year round, so that the impact of wind blown dusts will be kept to a minimum.

(b) Similarly, local sources of nitric oxide (NO) and ozone-reactive hydrocarbons can have a scavenging effect causing unrepresentatively low concentrations of O_3 in the vicinity of probes and monitoring paths for O_3. To minimize these potential interferences, the probe or at least 90 percent of the monitoring path must be away from furnace or incineration flues or other minor sources of SO_2 or NO. The separation distance should take into account the heights of the flues, type of waste or fuel burned, and the sulfur content of the fuel.

4. *Spacing From Obstructions.*

(a) Buildings and other obstacles may possibly scavenge SO_2, O_3, or NO_2, and can act to restrict airflow for any pollutant. To avoid this interference, the probe, inlet, or at least 90 percent of the monitoring path must have unrestricted airflow and be located away from obstacles. The distance from the obstacle to the probe, inlet, or monitoring path must be at least twice the height that the obstacle protrudes above the probe, inlet, or monitoring path. An exception to this requirement can be made for measurements taken in street canyons or at source-oriented sites where buildings and other structures are unavoidable.

(b) Generally, a probe or monitoring path located near or along a vertical wall is undesirable because air moving along the wall may be subject to possible removal mechanisms. A probe, inlet, or monitoring path must have unrestricted airflow in an arc of at least 180 degrees. This arc must include the predominant wind direction for the season of greatest pollutant concentration potential. For particle sampling, a minimum of 2 meters of separation from walls, parapets, and structures is required for rooftop site placement.

(c) Special consideration must be devoted to the use of open path analyzers due to their inherent potential sensitivity to certain types of interferences, or optical obstructions. A monitoring path must be clear of all trees, brush, buildings, plumes, dust, or other optical obstructions, including potential obstructions that may move due to wind, human activity, growth of vegetation, etc. Temporary optical obstructions, such as rain, particles, fog, or snow, should be considered when siting an open path analyzer. Any of these temporary obstructions that are of sufficient density to obscure the light beam will affect the ability of the open path analyzer to continuously measure pollutant concentrations. Transient, but significant obscuration of especially longer measurement paths could occur as a result of certain meteorological conditions (e.g., heavy fog, rain, snow) and/or aerosol levels that are of a sufficient density to prevent the open path analyzer's light transmission. If certain compensating measures are not otherwise implemented at the onset of monitoring (e.g., shorter path lengths, higher light source intensity), data recovery during periods of greatest primary pollutant potential could be compromised. For instance, if heavy fog or high particulate levels are coincident with periods of projected NAAQS-threatening pollutant potential, the representativeness of the resulting data record in reflecting maximum pollutant concentrations may be substantially impaired despite the fact that the site may otherwise exhibit an acceptable, even exceedingly high overall valid data capture rate.

5. *Spacing From Trees.*

(a) Trees can provide surfaces for SO_2, O_3, or NO_2 adsorption or reactions, and surfaces for particle deposition. Trees can also act as obstructions in cases where they are located between the air pollutant sources or source areas and the monitoring site, and where the trees are of a sufficient height and leaf canopy density to interfere with the normal airflow around the probe, inlet, or monitoring path. To reduce this possible interference/obstruction, the probe, inlet, or at least 90 percent of the monitoring path must be at least 10 meters or further from the drip line of trees.

(b) The scavenging effect of trees is greater for O_3 than for other criteria pollutants. Monitoring agencies must take steps to consider the impact of trees on ozone monitoring sites and take steps to avoid this problem.

(c) For microscale sites of any air pollutant, no trees or shrubs should be located between the probe and the source under investigation, such as a roadway or a stationary source.

6. *Spacing From Roadways.*

6.1 Spacing for Ozone and Oxide of Nitrogen Probes and Monitoring Paths. In siting an O_3 analyzer, it is important to minimize destructive interferences from sources of NO, since NO readily reacts with O_3. In siting NO_2 analyzers for neighborhood and urban scale monitoring, it is important to minimize interferences from automotive sources. Table E–1 of this appendix provides the required minimum separation distances between a roadway and a probe or, where applicable, at least 90 percent of a monitoring path for various ranges of daily roadway traffic. A sampling site having a point analyzer probe located closer to a roadway than allowed by the Table E–1 requirements should be classified as middle scale rather than neighborhood or urban scale, since the measurements from such a site would more closely represent the middle scale. If an open path analyzer is used at a site, the monitoring path(s) must not cross over a roadway with an average daily traffic count of 10,000 vehicles per day or more. For those situations where a monitoring path crosses a roadway with fewer than 10,000 vehicles per day, one must consider the entire segment of the monitoring path in the area of potential atmospheric interference from automobile emissions. Therefore, this calculation must include the length of the monitoring path over the roadway plus any segments of the monitoring path that lie in the area between the roadway and the minimum separation distance, as determined from Table E–1 of this appendix. The sum of these distances must not be greater than 10 percent of the total monitoring path length.

TABLE E–1 TO APPENDIX E OF PART 58.—MINIMUM SEPARATION DISTANCE BETWEEN ROADWAYS AND PROBES OR MONITORING PATHS FOR MONITORING NEIGHBORHOOD AND URBAN SCALE OZONE (O_3) AND OXIDES OF NITROGEN (NO, NO_2, NO_X, NO_Y)

Roadway average daily traffic, vehicles per day	Minimum distance[1] (meters)
≤1,000	10
10,000	20
15,000	30
20,000	40
40,000	60
70,000	100
110,000	250

[1] Distance from the edge of the nearest traffic lane. The distance for intermediate traffic counts should be interpolated from the table values based on the actual traffic count.

6.2 Spacing for Carbon monoxide Probes and Monitoring Paths. (a) Street canyon and traffic corridor sites (microscale) are intended to provide a measurement of the influence of the immediate source on the pollution exposure of the population. In order to provide some reasonable consistency and comparability in the air quality data from microscale sites, a minimum distance of 2 meters and a maximum distance of 10 meters from the edge of the nearest traffic lane must be maintained for these CO monitoring inlet probes. This should give consistency to the data, yet still allow flexibility of finding suitable locations.

(b) Street canyon/corridor (microscale) inlet probes must be located at least 10 meters from an intersection and preferably at a midblock location. Midblock locations are preferable to intersection locations because intersections represent a much smaller portion of downtown space than do the streets between them. Pedestrian exposure is probably also greater in street canyon/corridors than at intersections.

(c) In determining the minimum separation between a neighborhood scale monitoring site and a specific roadway, the presumption is made that measurements should not be substantially influenced by any one roadway. Computations were made to determine the separation distance, and Table E–2 of this appendix provides the required minimum separation distance between roadways and a probe or 90 percent of a monitoring path. Probes or monitoring paths that are located closer to roads than this criterion allows should not be classified as a neighborhood scale, since the measurements from such a site would closely represent the middle scale. Therefore, sites not meeting this criterion should be classified as middle scale.

TABLE E–2 TO APPENDIX E OF PART 58.—MINIMUM SEPARATION DISTANCE BETWEEN ROADWAYS AND PROBES OR MONITORING PATHS FOR MONITORING NEIGHBORHOOD SCALE CARBON MONOXIDE

Roadway average daily traffic, vehicles per day	Minimum distance [1] (meters)
≤10,000	10
15,000	25
20,000	45
30,000	80
40,000	115
50,000	135
≥60,000	150

[1] Distance from the edge of the nearest traffic lane. The distance for intermediate traffic counts should be interpolated from the table values based on the actual traffic count.

6.3 Spacing for Particulate Matter ($PM_{2.5}$, PM_{10}, Pb) Inlets. (a) Since emissions associated with the operation of motor vehicles contribute to urban area particulate matter ambient levels, spacing from roadway criteria are necessary for ensuring national consistency in PM sampler siting.

(b) The intent is to locate localized hot-spot sites in areas of highest concentrations whether it be from mobile or multiple stationary sources. If the area is primarily affected by mobile sources and the maximum concentration area(s) is judged to be a traffic corridor or street canyon location, then the monitors should be located near roadways with the highest traffic volume and at separation distances most likely to produce the highest concentrations. For the microscale traffic corridor site, the location must be between 5 and 15 meters from the major roadway. For the microscale street canyon site the location must be between 2 and 10 meters from the roadway. For the middle scale site, a range of acceptable distances from the roadway is shown in figure E–1 of this appendix. This figure also includes separation distances between a roadway and neighborhood or larger scale sites by default. Any site, 2 to 15 meters high, and further back than the middle scale requirements will generally be neighborhood, urban or regional scale. For example, according to Figure E–1 of this appendix, if a PM sampler is primarily influenced by roadway emissions and that sampler is set back 10 meters from a 30,000 ADT (average daily traffic) road, the site should be classified as microscale, if the sampler height is between 2 and 7 meters. If the sampler height is between 7 and 15 meters, the site should be classified as middle scale. If the sample is 20 meters from the same road, it will be classified as middle scale; if 40 meters, neighborhood scale; and if 110 meters, an urban scale.

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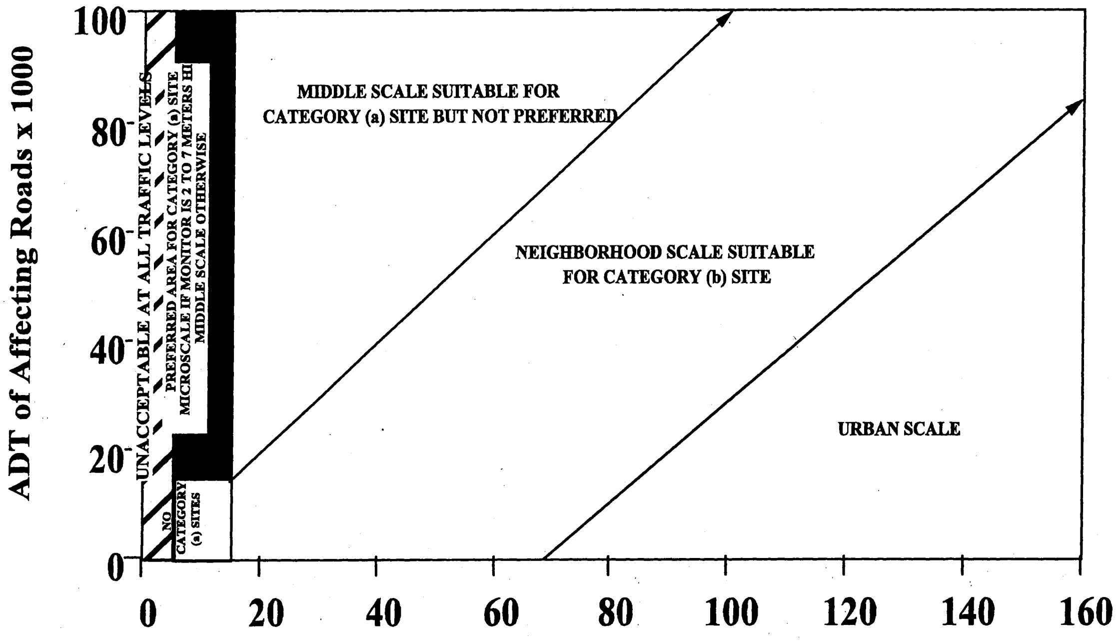

Figure E-1. Distance of PM samplers to nearest traffic lane (meters)

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7. *Cumulative Interferences on a Monitoring Path.*

(This paragraph applies only to open path analyzers.) The cumulative length or portion of a monitoring path that is affected by minor sources, trees, or roadways must not exceed 10 percent of the total monitoring path length.

8. *Maximum Monitoring Path Length.*

(This paragraph applies only to open path analyzers.) The monitoring path length must not exceed 1 kilometer for analyzers in neighborhood, urban, or regional scale. For middle scale monitoring sites, the monitoring path length must not exceed 300 meters. In areas subject to frequent periods of dust, fog, rain, or snow, consideration should be given to a shortened monitoring path length to minimize loss of monitoring data due to these temporary optical obstructions. For certain ambient air monitoring scenarios using open path analyzers, shorter path lengths may be needed in order to ensure that the monitoring site meets the objectives and spatial scales defined in appendix D to this part. The Regional Administrator may require shorter path lengths, as needed on an individual basis, to ensure that the SLAMS sites meet the appendix D requirements. Likewise, the Administrator may specify the maximum path length used at NCore monitoring sites.

9. *Probe Material and Pollutant Sample Residence Time.*

For the reactive gases, SO_2, NO_2, and O_3, special probe material must be used for point analyzers. (a) Studies [20–24] have been conducted to determine the suitability of materials such as polypropylene, polyethylene, polyvinyl chloride, Tygon®, aluminum, brass, stainless steel, copper, Pyrex® glass and Teflon® for use as intake sampling lines. Of the above materials, only Pyrex® glass and Teflon® have been found to be acceptable for use as intake sampling lines for all the reactive gaseous pollutants. Furthermore, the EPA[25] has specified borosilicate glass or FEP Teflon® as the only acceptable probe materials for delivering test atmospheres in the determination of reference or equivalent methods. Therefore, borosilicate glass, FEP Teflon®, or their equivalent must be used for existing and new NCore monitors.

(b) For volatile organic compound (VOC) monitoring at PAMS, FEP Teflon® is unacceptable as the probe material because of VOC adsorption and desorption reactions on the FEP Teflon®. Borosilicate glass, stainless steel, or its equivalent are the acceptable probe materials for VOC and carbonyl sampling. Care must be taken to ensure that the sample residence time is kept to 20 seconds or less.

(c) No matter how nonreactive the sampling probe material is initially, after a period of use reactive particulate matter is deposited on the probe walls. Therefore, the time it takes the gas to transfer from the probe inlet to the sampling device is also critical. Ozone in the presence of nitrogen oxide (NO) will show significant losses even in the most inert probe material when the residence time exceeds 20 seconds.[26] Other studies [27–28] indicate that a 10-second or less residence time is easily achievable. Therefore, sampling probes for reactive gas monitors at NCore must have a sample residence time less than 20 seconds.

10. *Waiver Provisions.*

Most sampling probes or monitors can be located so that they meet the requirements of this appendix. New sites with rare exceptions, can be located within the limits of this appendix. However, some existing sites may not meet these requirements and yet still produce useful data for some purposes. EPA will consider a written request from the State agency to waive one or more siting criteria for some monitoring sites providing that the State can adequately demonstrate the need (purpose) for monitoring or establishing a monitoring site at that location.

10.1 For establishing a new site, a waiver may be granted only if both of the following criteria are met:

10.1.1 The site can be demonstrated to be as representative of the monitoring area as it would be if the siting criteria were being met.

10.1.2 The monitor or probe cannot reasonably be located so as to meet the siting criteria because of physical constraints (e.g., inability to locate the required type of site the necessary distance from roadways or obstructions).

10.2 However, for an existing site, a waiver may be granted if either of the criteria in sections 10.1.1 and 10.1.2 of this appendix are met.

10.3 Cost benefits, historical trends, and other factors may be used to add support to the criteria in sections 10.1.1 and 10.1.2 of this appendix, however, they in themselves, will not be acceptable reasons for granting a waiver. Written requests for waivers must be submitted to the Regional Administrator.

11. *Summary.*

Table E–4 of this appendix presents a summary of the general requirements for probe and monitoring path siting criteria with respect to distances and heights. It is apparent from Table E–4 that different elevation distances above the ground are shown for the various pollutants. The discussion in this appendix for each of the pollutants describes reasons for elevating the monitor, probe, or monitoring path. The differences in the specified range of heights are based on the vertical concentration gradients. For CO, the gradients in the vertical direction are very large for the microscale, so a small range of heights are used. The upper limit of 15 meters is specified for consistency between pollutants and to allow the use of a single manifold or monitoring path for monitoring more than one pollutant.

TABLE E–4 OF APPENDIX E TO PART 58.—SUMMARY OF PROBE AND MONITORING PATH SITING CRITERIA

Pollutant	Scale (maximum monitoring path length, meters)	Height from ground to probe, inlet or 80% of monitoring path[1]	Horizontal and vertical distance supporting structures[2] to probe, inlet or 90% of monitoring path[1] (meters)	Distance from trees to probe, inlet or 90% of monitoring path[1] (meters)	Distance from roadways to probe, inlet or monitoring path[1] (meters)
SO_2[3, 4, 5, 6]	Middle (300 m) Neighborhood Urban, and Regional (1 km).	2–15	>1	>10	N/A.
CO[4, 5, 7]	Micro, middle (300 m), Neighborhood (1 km).	3±½: 2–15	> 1	> 10	2–10; see Table E–2 of this appendix for middle and neighborhood scales.
NO_2, O_3[3, 4, 5]	Middle (300 m) Neighborhood, Urban, and Regional (1 km).	2–15	> 1	> 10	See Table E–1 of this appendix for all scales.
Ozone precursors (for PAMS)[3, 4, 5].	Neighborhood and Urban (1 km).	2–15	> 1	> 10	See Table E–4 of this appendix for all scales.
PM, Pb[3, 4, 5, 6, 8]	Micro: Middle, Neighborhood, Urban and Regional.	2–7 (micro); 2–7 (middle $PM_{10\text{-}2.5}$); 2–15 (all other scales).	> 2 (all scales, horizontal distance only).	> 10 (all scales)	2–10 (micro); see Figure E–1 of this appendix for all other scales.

N/A—Not applicable.

[1] Monitoring path for open path analyzers is applicable only to middle or neighborhood scale CO monitoring and all applicable scales for monitoring SO_2,O_3, O_3 precursors, and NO_2.

[2] When probe is located on a rooftop, this separation distance is in reference to walls, parapets, or penthouses located on roof.

[3] Should be >20 meters from the dripline of tree(s) and must be 10 meters from the dripline when the tree(s) act as an obstruction.

[4] Distance from sampler, probe, or 90% of monitoring path to obstacle, such as a building, must be at least twice the height the obstacle protrudes above the sampler, probe, or monitoring path. Sites not meeting this criterion may be classified as middle scale (see text).

[5] Must have unrestricted airflow 270 degrees around the probe or sampler; 180 degrees if the probe is on the side of a building.

[6] The probe, sampler, or monitoring path should be away from minor sources, such as furnace or incineration flues. The separation distance is dependent on the height of the minor source's emission point (such as a flue), the type of fuel or waste burned, and the quality of the fuel (sulfur, ash, or lead content). This criterion is designed to avoid undue influences from minor sources.

[7] For microscale CO monitoring sites, the probe must be >10 meters from a street intersection and preferably at a midblock location.

[8] Collocated monitors must be within 4 meters of each other and at least 2 meters apart for flow rates greater than 200 liters/min or at least 1 meter apart for samplers having flow rates less than 200 liters/min to preclude airflow interference.

12. *References.*

1. Bryan, R.J., R.J. Gordon, and H. Menck. Comparison of High Volume Air Filter Samples at Varying Distances from Los Angeles Freeway. University of Southern California, School of Medicine, Los Angeles, CA. (Presented at 66th Annual Meeting of Air Pollution Control Association. Chicago, IL., June 24–28, 1973. APCA 73–158.)

2. Teer, E.H. Atmospheric Lead Concentration Above an Urban Street. Master of Science Thesis, Washington University, St. Louis, MO. January 1971.

3. Bradway, R.M., F.A. Record, and W.E. Belanger. Monitoring and Modeling of Resuspended Roadway Dust Near Urban Arterials. GCA Technology Division, Bedford, MA. (Presented at 1978 Annual Meeting of Transportation Research Board, Washington, DC. January 1978.)

4. Pace, T.G., W.P. Freas, and E.M. Afify. Quantification of Relationship Between Monitor Height and Measured Particulate Levels in Seven U.S. Urban Areas. U.S. Environmental Protection Agency, Research Triangle Park, NC. (Presented at 70th Annual Meeting of Air Pollution Control Association, Toronto, Canada, June 20–24, 1977. APCA 77–13.4.)

5. Harrison, P.R. Considerations for Siting Air Quality Monitors in Urban Areas. City of Chicago, Department of Environmental Control, Chicago, IL. (Presented at 66th Annual Meeting of Air Pollution Control Association, Chicago, IL., June 24–28, 1973. APCA 73–161.)

6. Study of Suspended Particulate Measurements at Varying Heights Above Ground. Texas State Department of Health, Air Control Section, Austin, TX. 1970. p. 7.

7. Rodes, C.E. and G.F. Evans. Summary of LACS Integrated Pollutant Data. In: Los Angeles Catalyst Study Symposium. U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA Publication No. EPA–600/4–77–034. June 1977.

8. Lynn, D.A. *et. al.* National Assessment of the Urban Particulate Problem: Volume 1, National Assessment. GCA Technology Division, Bedford, MA. U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA Publication No. EPA–450/3–75–024. June 1976.

9. Pace, T.G. Impact of Vehicle-Related Particulates on TSP Concentrations and Rationale for Siting Hi-Vols in the Vicinity of Roadways. OAQPS, U.S. Environmental Protection Agency, Research Triangle Park, NC. April 1978.

10. Ludwig, F.L., J.H. Kealoha, and E. Shelar. Selecting Sites for Monitoring Total Suspended Particulates. Stanford Research Institute, Menlo Park, CA. Prepared for U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA Publication No. EPA–450/3–77–018. June 1977, revised December 1977.

11. Ball, R.J. and G.E. Anderson. Optimum Site Exposure Criteria for SO_2 Monitoring. The Center for the Environment and Man, Inc., Hartford, CT. Prepared for U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA Publication No. EPA–450/3–77–013. April 1977.

12. Ludwig, F.L. and J.H.S. Kealoha. Selecting Sites for Carbon Monoxide Monitoring. Stanford Research Institute, Menlo Park, CA. Prepared for U.S. Environmental Protection Agency, Research Park, NC. EPA Publication No. EPA–450/3–75–077. September 1975.

13. Ludwig, F.L. and E. Shelar. Site Selection for the Monitoring of Photochemical Air Pollutants. Stanford Research Institute, Menlo Park, CA. Prepared for U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA Publication No. EPA–450/3–78–013. April 1978.

14. Lead Analysis for Kansas City and Cincinnati, PEDCo Environmental, Inc., Cincinnati, OH. Prepared for U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA Contract No. 66–02–2515, June 1977.

15. Barltrap, D. and C. D. Strelow. Westway Nursery Testing Project. Report to the Greater London Council. August 1976.

16. Daines, R.H., H. Moto, and D. M. Chilko. Atmospheric Lead: Its Relationship to Traffic Volume and Proximity to Highways. Environ. Sci. and Technol., 4:318, 1970.

17. Johnson, D.E., *et al.* Epidemiologic Study of the Effects of Automobile Traffic on Blood Lead Levels, Southwest Research Institute, Houston, TX. Prepared for U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA–600/1–78–055, August 1978.

18. Air Quality Criteria for Lead. Office of Research and Development, U.S. Environmental Protection Agency, Washington, DC EPA–600/8–83–028 aF–dF, 1986, and supplements EPA–600/8–89/049F, August 1990. (NTIS document numbers PB87–142378 and PB91–138420.)

19. Lyman, D.R. The Atmospheric Diffusion of Carbon monoxide and Lead from an Expressway, Ph.D. Dissertation, University of Cincinnati, Cincinnati, OH. 1972.

20. Wechter, S.G. Preparation of Stable Pollutant Gas Standards Using Treated Aluminum Cylinders. ASTM STP. 598:40–54, 1976.

21. Wohlers, H.C., H. Newstein and D. Daunis. Carbon Monoxide and Sulfur Dioxide Adsorption On and Description From Glass, Plastic and Metal Tubings. J. Air Poll. Con. Assoc. 17:753, 1976.

22. Elfers, L.A. Field Operating Guide for Automated Air Monitoring Equipment. U.S. NTIS. p. 202, 249, 1971.

23. Hughes, E.E. Development of Standard Reference Material for Air Quality Measurement. ISA Transactions, 14:281–291, 1975.

24. Altshuller, A.D. and A.G. Wartburg. The Interaction of Ozone with Plastic and Metallic Materials in a Dynamic Flow System. Intern. Jour. Air and Water Poll., 4:70–78, 1961.

25. Code of Federal Regulations. Title 40 part 53.22, July 1976.

26. Butcher, S.S. and R.E. Ruff. Effect of Inlet Residence Time on Analysis of Atmospheric Nitrogen Oxides and Ozone, Anal. Chem., 43:1890, 1971.

27. Slowik, A.A. and E.B. Sansone. Diffusion Losses of Sulfur Dioxide in Sampling Manifolds. J. Air. Poll. Con. Assoc., 24:245, 1974.

28. Yamada, V.M. and R.J. Charlson. Proper Sizing of the Sampling Inlet Line for a Continuous Air Monitoring Station. Environ. Sci. and Technol., 3:483, 1969.

29. Koch, R.C. and H.E. Rector. Optimum Network Design and Site Exposure Criteria for Particulate Matter, GEOMET Technologies, Inc., Rockville, MD. Prepared for U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA Contract No. 68–02–3584. EPA 450/4–87–009. May 1987.

30. Burton, R.M. and J.C. Suggs. Philadelphia Roadway Study. Environmental Monitoring Systems Laboratory, U.S. Environmental Protection Agency, Research Triangle Park, N.C. EPA–600/4–84–070 September 1984.

31. Technical Assistance Document For Sampling and Analysis of Ozone Precursors. Atmospheric Research and Exposure Assessment Laboratory, U.S. Environmental Protection Agency, Research Triangle Park, NC 27711. EPA 600/8–91–215. October 1991.

32. Quality Assurance Handbook for Air Pollution Measurement Systems: Volume IV. Meteorological Measurements. Atmospheric Research and Exposure Assessment Laboratory, U.S. Environmental Protection Agency, Research Triangle Park, NC 27711. EPA 600/4–90–0003. August 1989.

33. On-Site Meteorological Program Guidance for Regulatory Modeling Applications. Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, NC 27711. EPA 450/4–87–013. June 1987.

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