

40 CFR 50 - National Primary & Secondary Ambient Air Quality Standards

This regulation provides the national ambient air quality standards and requirements for their interpretation, which we are not reviewing or revising with this monitoring regulation review. It is worth knowing about the various federal reference methods for the criteria pollutants.

...

Appendix A - Reference Method for SO₂ (Pararosaniline Method)

Appendix B - Reference Method for TSP (High-volume Method)

Appendix C - Reference Method for CO (Non-dispersive Infrared Photometry)

Appendix D - Reference Method for O₃ (Chemiluminescence Method)

Appendix F - Reference Method for NO₂ (Gas Phase Chemiluminescence)

Appendix G - Reference Method for Pb Measured from TSP

...

Appendix J & M - Reference Method for PM₁₀

...

Appendix L - Reference Method for PM_{2.5}

...

40 CFR 53 - Ambient Air Monitoring Reference & Equivalent Methods

This regulation provides:

- c definitions for what reference/equivalent/candidate method,
- c expectations for how the testing approval process takes place, and responsibilities for EPA and the method manufacturer/applicant,
- c testing procedures for all federal reference/equivalent methods
 - c automated (gaseous generally) methods
 - c PM - including special provisions for PM_{2.5} Class I, II, and III FEMs.

40 CFR 58 - Ambient Air Quality Surveillance

This regulation provides:

- c general provisions, including definitions, purpose of the rule, who it applies to.
- c monitoring/measurement criteria including reference to later part 58 appendices on quality assurance, monitoring methods, monitor siting, operating (sampling schedule), special purpose monitors (includes the special provision for PM_{2.5} SPMs that allows you to sample for 2 years without making a nonattainment determination).
- c SLAMS network plan requirements (refers to Appendix D), and includes the provisions requesting annual network reviews and reports, and data reporting requirements
- c NAMS and PAMS network plan requirements (as with SLAMS, this refers the reader to Appendix D). These parts are written in a similar manner as that for SLAMS.

- c provides authority to the EPA to conduct federal monitoring and to monitor for non-criteria pollutants if national interests warrant.
- c Appendices are used in part 58 to provide much more detail on QA/QC, use of FRM/FEMs, network design and requirements, siting requirements, annual SLAMS data reports, and the AQI.

Appendices A & B - Quality Assurance - these appendices (one for the SLAMS and one for Prevention of Significant Deterioration monitoring) are written identically almost for the PSD and the SLAMS networks, with PSD applying to fewer pollutants than the SLAMS. These are considered to be minimum requirements, and supplements to these are provided in other EPA documents such as the Quality Assurance Handbook, Volume II, and other quality assurance management and project plans. These appendices cover precision, bias, accuracy assessments, flow rate audit requirements, and the PEP.

Appendix C - Measurement methodology - this appendix tells you several things:

- c criteria pollutant monitoring methods used at SLAMS/NAMS/PAMS will be FRMs or FEMs, with limited exceptions. The exceptions include using a TSP sampler as a substitute for a PM₁₀ sampler in areas with low PM₁₀ concentrations,
- c what you can do with a sampler if its EPA FRM/FEM designation is withdrawn,
- c how to gain approval for using a non-designated PM_{2.5} sampler within a SLAMS network (with many testing/reporting requirements),
- c information on short-term PM₁₀ episode monitoring.

Appendix D - Network design criteria - this appendix discusses how ambient air pollution networks are designed including 6 basic monitoring objectives, 5 spatial scales of representation, SLAMS network design criteria & requirements for each of the criteria pollutants (SO₂, CO, Pb, NO₂, O₃, PM₁₀, PM_{2.5}), and NAMS/PAMS monitoring requirements. The concept of seasonal sampling is introduced, and specific ozone seasons are listed in a table. With the PM_{2.5} NAAQS in 1997, language about community monitoring zones and monitoring planning areas was added, along with an additional emphasis on population oriented types of monitoring networks. Here is a summary estimate of the monitoring requirements for the SLAMS, along with estimates of how many are operating and how many nonattainment areas exist for each. It is important to also understand that there are many objectives for these sites, and designations is only one of these objectives.

Pollutant	# Sites in AIRS	SLAMS Requirement*	Nonattainment Areas
PM ₁₀	~1,500	144-1,432	~75 counties
PM _{2.5}	1,100	850	Not designated
SO ₂	~600	94-974	~23 counties
CO	~510	120	20 areas/~47 counties
NO ₂	~440	68 + add'l PAMS	0
O ₃	~1,140	250	32 areas/~266 counties (1-hr only right now)
Pb	~240 (only one to decrease in last 5 yrs)	10 + source oriented sites	5 areas
PAMS	46 (some are not yet designated as PAMS)	networks in all serious, severe & extreme O ₃ areas	5-6 general geographic regions - NE, Atlanta, Great Lakes, Houston, Dallas, St. Louis?, west (CA)

*The NAMS requirements are as follows:

CO: 2 sites per urbanized area >500,000.

NO₂: 2 sites per urbanized area >1,000,000 plus any in PAMS networks.

O₃: 2 sites per urbanized area >200,000.

SO₂: # of sites is based upon population (beginning at 100,000 for an urbanized area), and measured concentrations (60% of the SO₂ NAAQS is considered a medium value, more polluted areas must run more monitors).

PM₁₀: # of sites is based upon population (beginning at 100,000 for an MSA), and measured concentrations (80-120% of the PM₁₀ NAAQS is considered a medium value, more polluted areas must run more monitors).

Pb: 1 site in the largest (or second largest) MSA in each EPA Region, plus any source oriented sites that have violated the Pb NAAQS in the last 8 quarters (not many of these).

Appendix E - Siting Criteria - this appendix discusses the appropriate monitoring probe/path siting criteria for SLAMS/NAMS/PAMS pollutants, and recommendations for siting situations that a monitoring agency should avoid. This includes a discussion of horizontal and vertical placement of an intake probe/path, spacing from minor sources, obstructions, trees, and roadways.

Appendix F - Annual SLAMS reports - this appendix describes what information (both siting information and data) should be provided by a monitoring agency into EPA's AIRS database for their SLAMS network. Essentially, the annual SLAMS report is used as a certification process that tells EPA that a year's data are ready to be used for regulatory purposes.

Appendix G - Uniform Air Quality Index Reporting - this appendix tells an agency what the AQI is, who must report it, how to calculate the AQI for a MSA, and the range of values that can be calculated with a brief statement used to describe air quality for that range of values. This appendix was written using a clear "plain English" style that we would want to use for the entire regulation where possible.

Future Directions for the Monitoring Program Regulations:

Our current regulations have been amended several times through the last twenty years to account for new program directions or new technologies, but a total review of the regulations has not been completed recently. As a result, parts of the regulation read very differently from others, and sometimes the language is just not clear. Additionally, there are several monitoring program areas that warrant additional attention due to policy changes and new NAAQS attainment strategies. Some of these include:

- C Monitoring to support attainment strategies such as the NO_x SIP Call.
- C Possible new multi-pollutant utilities strategy (mercury, nitrogen oxides, sulfur dioxide)
- C Short-term SO₂ measurements to support investigation into health effects of 5-minute SO₂ peaks.
- C Revisiting the PAMS requirements, and modifying if necessary.
- C Provide more flexibility to the Regions to waive some monitoring requirements.
- C Incorporate population growth into requirements, particularly in areas around large metropolitan centers.
- C Provide less frequent, but more detailed network design reviews.
- C Reduce burden where possible and redirect resources back into other monitoring program areas.
- C Consider additional monitoring to support climate change, international border issues, or global issues where it intersects with national air quality interests.