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# Title 40—Protection of Environment

(This book contains parts 53–59)

*Part*

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# CHAPTER I—ENVIRONMENTAL PROTECTION AGENCY (CONTINUED)

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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.

SOURCE: 40 FR 7049, Feb. 18, 1975, unless otherwise noted.

## Subpart A—General Provisions

SOURCE: 62 FR 38784, July 18, 1997, unless otherwise noted.

### § 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 Federal reference method or Federal 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 Federal reference method determination or a Federal 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 $PM_{10-2.5}$ 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 $PM_{10-2.5}$ that utilizes a $PM_{2.5}$ sampler or

$PM_{10-2.5}$ sampler in which integrated $PM_{2.5}$ samples or $PM_{10-2.5}$ 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 monoxide.

*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.

*Federal equivalent method (FEM)* 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.

*Federal reference method (FRM)* 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.

*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; or

(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 Federal reference method and Federal 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.

*$PM_{2.5}$* 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 this part or by an equivalent method designated in accordance with this part.

*$PM_{10C}$* 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 this part or by an equivalent method designated in accordance with this part.

*$PM_{10-2.5}$* 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 this part or by an equivalent method designated in accordance with this part.

*$PM_{2.5}$ 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.

*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 Federal reference method or a Federal equivalent method for purposes other than resale.

[71 FR 61271, Oct. 17, 2006]

### § 53.2 General requirements for a reference method determination.

The following general requirements for a Federal reference method (FRM) 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 FRM for measuring these pollutants. Except as provided in § 53.16, other manual methods for $SO_2$ and lead will not be considered for FRM determinations under this part.

(2) *$PM_{10}$.* A FRM 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 FRM 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, FRM 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 FRM 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, $PM_{10-2.5}$ FRM 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 FRM 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.

[71 FR 61271, Oct. 17, 2006]

### §53.3 General requirements for an equivalent method determination.

(a) *Manual methods*. A manual Federal equivalent method (FEM) 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 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 FEM 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 FRM sampler specifications does not significantly alter the performance of the sampler.

(3) *$PM_{2.5}$ Class II*. (i) A $PM_{2.5}$ Class II FEM 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 $PM_{2.5}$ FEM 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 FEM 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 FEM sampler 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 $PM_{10-2.5}$ FEM 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 FEMs for $PM_{10-2.5}$ in subpart C of this part.

(6) *ISO 9001*. All designated FEMs 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 FEMs 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 FEM must have been shown in accordance with this part to satisfy the following additional requirements, as applicable:

(1) An automated FEM 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 FEM 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 FEM 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 FEM 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.

[71 FR 61271, Oct. 17, 2006]

### § 53.4 Applications for reference or equivalent method determinations.

(a) Applications for FRM or FEM 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 trouble-shooting 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 $PM_{10-2.5}$ 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 $PM_{10-2.5}$ 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 $PM_{10-2.5}$, 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. The EPA does not warrant or assume any liability for the condition of the analyzer or sampler upon return to the applicant.

[71 FR 61271, Oct. 17, 2006]

### §53.5 Processing of applications.

After receiving an application for a FRM or FEM 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).

[71 FR 61271, Oct. 17, 2006]

### § 53.6 Right to witness conduct of tests.

(a) Submission of an application for a reference or equivalent method determination shall constitute consent for the Administrator or the Administrator's authorized representative, upon presentation of appropriate credentials, to witness or observe any tests required by this part in connection with the application or in connection with any modification or intended modification of the method by the applicant.

(b) The applicant shall have the right to witness or observe any test conducted by the Administrator in connection with the application or in connection with any modification or intended modification of the method by the applicant.

(c) Any tests by either party that are to be witnessed or observed by the other party shall be conducted at a time and place mutually agreeable to both parties.

### § 53.7 Testing of methods at the initiative of the Administrator.

(a) In the absence of an application for a reference or equivalent method determination, the Administrator may conduct the tests required by this part for such a determination, may compile such other information as may be necessary in the judgment of the Administrator to make such a determination, and on the basis of the tests and information may determine that a method satisfies applicable requirements of this part.

(b) In the absence of an application requesting the Administrator to consider revising an appendix to part 50 of this chapter in accordance with § 53.16, the Administrator may conduct such tests and compile such information as may be necessary in the Administrator's judgment to make a determination under § 53.16(d) and on the basis of the tests and information make such a determination.

(c) If a method tested in accordance with this section is designated as a reference or equivalent method in accordance with § 53.8 or is specified or designated as a reference method in accordance with § 53.16, any person or entity who offers the method for sale as a reference or equivalent method thereafter shall assume the rights and obligations of an applicant for purposes of this part, with the exception of those pertaining to submission and processing of applications.

### § 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 FRM or FEM (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 FRM or FEM shall be sent to the applicant.

(c) The Administrator will maintain a current list of methods designated as FRM or FEM 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.

[71 FR 61276, Oct. 17, 2006]

### § 53.9 Conditions of designation.

Designation of a candidate method as a FRM or FEM 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 FRM or FEM 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 FRM or FEM 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 $PM_{10-2.5}$ sampler offered for sale as part of a FRM or FEM 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 $PM_{10-2.5}$ sampler offered for sale as a FRM or FEM shall bear a prominent, permanently affixed label or sticker indicating that the analyzer or sampler has been designated by EPA as a FRM or FEM (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 FRM or FEM 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 FRM or FEM.

(f) An applicant who offers analyzers, $PM_{10}$ samplers, $PM_{2.5}$ samplers, or $PM_{10-2.5}$ samplers for sale as FRM or FEMs 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 FRM or FEM 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 $PM_{10-2.5}$ sampler that has been designated as a FRM or FEM, 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 FRM or FEM determination for the modified analyzer or sampler.

(h) An applicant who has offered $PM_{2.5}$ or $PM_{10-2.5}$ samplers or analyzers for sale as part of a FRM or FEM 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 FRM or FEM designation under §53.11.

(i) An applicant who has offered $PM_{2.5}$ or $PM_{10-2.5}$ samplers or analyzers for sale as part of a FRM or FEM 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.

[71 FR 61276, Oct. 17, 2006]

### §53.10 Appeal from rejection of application.

Any applicant whose application for a reference or equivalent method determination has been rejected may appeal the Administrator's decision by taking one or more of the following actions:

(a) The applicant may submit new or additional information in support of the application.

(b) The applicant may request that the Administrator reconsider the data and information already submitted.

(c) The applicant may request that any test conducted by the Administrator that was a material factor in the

decision to reject the application be repeated.

### § 53.11 Cancellation of reference or equivalent method designation.

(a) *Preliminary finding.* If the Administrator makes a preliminary finding on the basis of any available information that a representative sample of a method designated as a reference or equivalent method and offered for sale as such does not fully satisfy the requirements of this part or that there is any violation of the requirements set forth in § 53.9, the Administrator may initiate proceedings to cancel the designation in accordance with the following procedures.

(b) *Notification and opportunity to demonstrate or achieve compliance.* (1) After making a preliminary finding in accordance with paragraph (a) of this section, the Administrator will send notice of the preliminary finding to the applicant, together with a statement of the facts and reasons on which the preliminary finding is based, and will publish notice of the preliminary finding in the FEDERAL REGISTER.

(2) The applicant will be afforded an opportunity to demonstrate or to achieve compliance with the requirements of this part within 60 days after publication of notice in accordance with paragraph (b)(1) of this section or within such further period as the Administrator may allow, by demonstrating to the satisfaction of the Administrator that the method in question satisfies the requirements of this part, by commencing a program to make any adjustments that are necessary to bring the method into compliance, or by taking such action as may be necessary to cure any violation of the requirements of § 53.9. If adjustments are necessary to bring the method into compliance, all such adjustments shall be made within a reasonable time as determined by the Administrator. If the applicant demonstrates or achieves compliance in accordance with this paragraph (b)(2), the Administrator will publish notice of such demonstration or achievement in the FEDERAL REGISTER.

(c) *Request for hearing.* Within 60 days after publication of a notice in accordance with paragraph (b)(1) of this section, the applicant or any interested person may request a hearing as provided in § 53.12.

(d) *Notice of cancellation.* If, at the end of the period referred to in paragraph (b)(2) of this section, the Administrator determines that the reference or equivalent method designation should be canceled, a notice of cancellation will be published in the FEDERAL REGISTER and the designation will be deleted from the list maintained under § 53.8(c). If a hearing has been requested and granted in accordance with § 53.12, action under this paragraph (d) will be taken only after completion of proceedings (including any administrative review) conducted in accordance with § 53.13 and only if the decision of the Administrator reached in such proceedings is that the designation in question should be canceled.

### § 53.12 Request for hearing on cancellation.

Within 60 days after publication of a notice in accordance with § 53.11(b)(1), the applicant or any interested person may request a hearing on the Administrator's action. If, after reviewing the request and supporting data, the Administrator finds that the request raises a substantial issue of fact, a hearing will be granted in accordance with § 53.13 with respect to such issue. The request shall be in writing, signed by an authorized representative of the applicant or interested person, and shall include a statement specifying:

(a) Any objections to the Administrator's action.

(b) Data or other information in support of such objections.

### § 53.13 Hearings.

(a)(1) After granting a request for a hearing under § 53.12, the Administrator will designate a presiding officer for the hearing.

(2) If a time and place for the hearing have not been fixed by the Administrator, the hearing will be held as soon as practicable at a time and place fixed by the presiding officer, except that the hearing shall in no case be held sooner than 30 days after publication of a notice of hearing in the FEDERAL REGISTER.

(3) For purposes of the hearing, the parties shall include EPA, the applicant or interested person(s) who requested the hearing, and any person permitted to intervene in accordance with paragraph (c) of this section.

(4) The Deputy General Counsel or the Deputy General Counsel's representative will represent EPA in any hearing under this section.

(5) Each party other than EPA may be represented by counsel or by any other duly authorized representative.

(b)(1) Upon appointment, the presiding officer will establish a hearing file. The file shall contain copies of the notices issued by the Administrator pursuant to §53.11(b)(1), together with any accompanying material, the request for a hearing and supporting data submitted therewith, the notice of hearing published in accordance with paragraph (a)(2) of this section, and correspondence and other material data relevant to the hearing.

(2) The hearing file shall be available for inspection by the parties or their representatives at the office of the presiding officer, except to the extent that it contains information identified in accordance with §53.15.

(c) The presiding officer may permit any interested person to intervene in the hearing upon such a showing of interest as the presiding officer may require; provided that permission to intervene may be denied in the interest of expediting the hearing where it appears that the interests of the person seeking to intervene will be adequately represented by another party (or by other parties), including EPA.

(d)(1) The presiding officer, upon the request of any party or at the officer's discretion, may arrange for a prehearing conference at a time and place specified by the officer to consider the following:

(i) Simplification of the issues.

(ii) Stipulations, admissions of fact, and the introduction of documents.

(iii) Limitation of the number of expert witnesses.

(iv) Possibility of agreement on disposing of all or any of the issues in dispute.

(v) Such other matters as may aid in the disposition of the hearing, including such additional tests as may be agreed upon by the parties.

(2) The results of the conference shall be reduced to writing by the presiding officer and made part of the record.

(e)(1) Hearings shall be conducted by the presiding officer in an informal but orderly and expeditious manner. The parties may offer oral or written evidence, subject to exclusion by the presiding officer of irrelevant, immaterial, or repetitious evidence.

(2) Witnesses shall be placed under oath.

(3) Any witness may be examined or cross-examined by the presiding officer, the parties, or their representatives. The presiding officer may, at his/her discretion, limit cross-examination to relevant and material issues.

(4) Hearings shall be reported verbatim. Copies of transcripts of proceedings may be purchased from the reporter.

(5) All written statements, charts, tabulations, and data offered in evidence at the hearing shall, upon a showing satisfactory to the presiding officer of their authenticity, relevancy, and materiality, be received in evidence and shall constitute part of the record.

(6) Oral argument shall be permitted. The presiding officer may limit oral presentations to relevant and material issues and designate the amount of time allowed for oral argument.

(f)(1) The presiding officer shall make an initial decision which shall include written findings and conclusions and the reasons therefore on all the material issues of fact, law, or discretion presented on the record. The findings, conclusions, and written decision shall be provided to the parties and made part of the record. The initial decision shall become the decision of the Administrator without further proceedings unless there is an appeal to, or review on motion of, the Administrator within 30 calendar days after the initial decision is filed.

(2) On appeal from or review of the initial decision, the Administrator will have all the powers consistent with making the initial decision, including the discretion to require or allow briefs, oral argument, the taking of additional evidence or the remanding to

the presiding officer for additional proceedings. The decision by the Administrator will include written findings and conclusions and the reasons or basis therefore on all the material issues of fact, law, or discretion presented on the appeal or considered in the review.

### § 53.14 Modification of a reference or equivalent method.

(a) An applicant who offers a method for sale as a reference or equivalent method shall report to the EPA Administrator prior to implementation any intended modification of the method, including but not limited to modifications of design or construction or of operational and maintenance procedures specified in the operation manual (see § 53.9(g)). The report shall be signed by an authorized representative of the applicant, marked in accordance with § 53.15 (if applicable), and addressed as specified in § 53.4(a).

(b) A report submitted under paragraph (a) of this section shall include:

(1) A description, in such detail as may be appropriate, of the intended modification.

(2) A brief statement of the applicant's belief that the modification will, will not, or may affect the performance characteristics of the method.

(3) A brief statement of the probable effect if the applicant believes the modification will or may affect the performance characteristics of the method.

(4) Such further information, including test data, as may be necessary to explain and support any statement required by paragraphs (b)(2) and (b)(3) of this section.

(c) Within 30 calendar days after receiving a report under paragraph (a) of this section, the Administrator will take one or more of the following actions:

(1) Notify the applicant that the designation will continue to apply to the method if the modification is implemented.

(2) Send notice to the applicant that a new designation will apply to the method (as modified) if the modification is implemented, submit notice of the determination for publication in the FEDERAL REGISTER, and revise or supplement the list referred to in § 53.8(c) to reflect the determination.

(3) Send notice to the applicant that the designation will not apply to the method (as modified) if the modification is implemented and submit notice of the determination for publication in the FEDERAL REGISTER.

(4) 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 30-day period shall commence upon receipt of the additional information).

(5) Send notice to the applicant that additional tests are necessary and specify what tests are necessary and how they shall be interpreted (in such cases, the 30-day period shall commence upon receipt of the additional test data).

(6) Send notice to the applicant that additional tests will be conducted by the Administrator and specify the reasons for and the nature of the additional tests (in such cases, the 30-day period shall commence 1 calendar day after the additional tests are completed).

(d) An applicant who has received a notice under paragraph (c)(3) of this section may appeal the Administrator's action as follows:

(1) The applicant may submit new or additional information pertinent to the intended modification.

(2) The applicant may request the Administrator to reconsider data and information already submitted.

(3) The applicant may request that the Administrator repeat any test conducted that was a material factor in the Administrator's determination. A representative of the applicant may be present during the performance of any such retest.

### § 53.15 Trade secrets and confidential or privileged information.

Any information submitted under this part that is claimed to be a trade secret or confidential or privileged information shall be marked or otherwise clearly identified as such in the submittal. Information so identified will be treated in accordance with part 2 of this chapter (concerning public information).

**§53.16 Supersession of reference methods.**

(a) This section prescribes procedures and criteria applicable to requests that the Administrator specify a new reference method, or a new measurement principle and calibration procedure on which reference methods shall be based, by revision of the appropriate appendix to part 50 of this chapter. Such action will ordinarily be taken only if the Administrator determines that a candidate method or a variation thereof is substantially superior to the existing reference method(s).

(b) In exercising discretion under this section, the Administrator will consider:

(1) The benefits, in terms of the requirements and purposes of the Act, that would result from specifying a new reference method or a new measurement principle and calibration procedure.

(2) The potential economic consequences of such action for State and local control agencies.

(3) Any disruption of State and local air quality monitoring programs that might result from such action.

(c) An applicant who wishes the Administrator to consider revising an appendix to part 50 of this chapter on the ground that the applicant's candidate method is substantially superior to the existing reference method(s) shall submit an application for a reference or equivalent method determination in accordance with §53.4 and shall indicate therein that such consideration is desired. The application shall include, in addition to the information required by §53.4, data and any other information supporting the applicant's claim that the candidate method is substantially superior to the existing reference method(s).

(d) After receiving an application under paragraph (c) of this section, the Administrator will publish notice of its receipt in the FEDERAL REGISTER and, within 120 calendar days after receipt of the application, take one of the following actions:

(1) Determine that it is appropriate to propose a revision of the appendix to part 50 of this chapter in question and send notice of the determination to the applicant.

(2) Determine that it is inappropriate to propose a revision of the appendix to part 50 of this chapter in question, determine whether the candidate method is a reference or equivalent method, and send notice of the determinations, including a statement of reasons for the determination not to propose a revision, to the applicant.

(3) 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).

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

(5) 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).

(e)(1)(i) After making a determination under paragraph (d)(1) of this section, the Administrator will publish a notice of proposed rulemaking in the FEDERAL REGISTER. The notice of proposed rulemaking will indicate that the Administrator proposes:

(A) To revise the appendix to part 50 of this chapter in question.

(B) Where the appendix specifies a measurement principle and calibration procedure, to cancel reference method designations based on the appendix.

(C) To cancel equivalent method designations based on the existing reference method(s).

(ii) The notice of proposed rulemaking will include the terms or substance of the proposed revision, will indicate what period(s) of time the Administrator proposes to allow for replacement of existing methods under section 2.3 of appendix C to part 58 of this chapter, and will solicit public comments on the proposal with particular reference to the considerations

set forth in paragraphs (a) and (b) of this section.

(2)(i) If, after consideration of comments received, the Administrator determines that the appendix to part 50 in question should be revised, the Administrator will, by publication in the FEDERAL REGISTER:

(A) Promulgate the proposed revision, with such modifications as may be appropriate in view of comments received.

(B) Where the appendix to part 50 (prior to revision) specifies a measurement principle and calibration procedure, cancel reference method designations based on the appendix.

(C) Cancel equivalent method designations based on the existing reference method(s).

(D) Specify the period(s) that will be allowed for replacement of existing methods under section 2.3 of appendix C to part 58 of this chapter, with such modifications from the proposed period(s) as may be appropriate in view of comments received.

(3) Canceled designations will be deleted from the list maintained under § 53.8(c). The requirements and procedures for cancellation set forth in § 53.11 shall be inapplicable to cancellation of reference or equivalent method designations under this section.

(4) If the appendix to part 50 of this chapter in question is revised to specify a new measurement principle and calibration procedure on which the applicant's candidate method is based, the Administrator will take appropriate action under § 53.5 to determine whether the candidate method is a reference method.

(5) Upon taking action under paragraph (e)(2) of this section, the Administrator will send notice of the action to all applicants for whose methods reference and equivalent method designations are canceled by such action.

(f) An applicant who has received notice of a determination under paragraph (d)(2) of this section may appeal the determination by taking one or more of the following actions:

(1) The applicant may submit new or additional information in support of the application.

(2) The applicant may request that the Administrator reconsider the data and information already submitted.

(3) The applicant may request that any test conducted by the Administrator that was a material factor in making the determination be repeated.

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] | | |
| | Equivalent Class III | Automated | L[1] | ✓ | ✓ | ✓[1] | ✓[1] | | |
| $PM_{10-2.5}$ | Reference | Manual | O[2] | ✓ | ✓ | | | | |
| | Equivalent Class I | Manual | $O_2$ | ✓ | ✓ | | | | |
| | Equivalent Class II | Manual | O[2] | ✓ | ✓[2] | ✓[1] | ✓[1,2] | | |

| 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],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.

[71 FR 61276, Oct. 17, 2006]

APPENDIX A TO SUBPART A OF PART 53—REFERENCES

(1) American National Standard Quality Systems—Model for Quality Assurance in Design, Development, Production, Installation, and Servicing, ANSI/ISO/ASQC Q9001–1994. Available from American Society for Quality, P.O. Box 3005, Milwaukee, WI 53202 (*http://qualitypress.asq.org*).

(2) American National Standard Quality Systems for Environmental Data and Technology Programs—Requirements with guidance for use, ANSI/ASQC E4–2004. Available from American Society for Quality P.O. Box 3005, Milwaukee, WI 53202 (*http://qualitypress.asq.org*).

(3) Dimensioning and Tolerancing, ASME Y14.5M-1994. Available from the American Society of Mechanical Engineers, 345 East 47th Street, New York, NY 10017.

(4) Mathematical Definition of Dimensioning and Tolerancing Principles, ASME Y14.5.1M-1994. Available from the American Society of Mechanical Engineers, 345 East 47th Street, New York, NY 10017.

(5) ISO 10012, Quality Assurance Requirements for Measuring Equipment-Part 1: Meteorological confirmation system for measuring equipment):1992(E). Available from American Society for Quality Control, 611 East Wisconsin Avenue, Milwaukee, WI 53202.

(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*.

[62 FR 38784, July 18, 1997, as amended at 71 FR 61278, Oct. 17, 2006]

## Subpart B—Procedures for Testing Performance Characteristics of Automated Methods $SO_2$, CO, $O_3$, and $NO_2$

### § 53.20 General provisions.

(a) The test procedures given in this subpart shall be used to test the performance of candidate automated methods against the performance specifications given in table B–1. A test analyzer representative of the candidate automated method must exhibit performance better than, or equal to, the specified value for each such specification (except Range) to satisfy the requirements of this subpart. Except as provided in paragraph (b) of this section, the range of the candidate method must be the range specified in table B–1 to satisfy the requirements of this subpart.

(b) For a candidate method having more than one selectable range, one range must be that specified in table B–1 and a test analyzer representative of the method must pass the tests required by this subpart while operated in that range. The tests may be repeated for a broader range (i.e., one extending to higher concentrations) than that specified in table B–1 provided that the range does not extend to concentrations more than two times the upper range limit specified in table B–1. If the application is for a reference method determination, the tests may be repeated for a narrower range (one extending to lower concentrations) than that specified in table B–1.

If the tests are conducted or passed only for the specified range, any reference or 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, provided that the tests required by subpart C of this part (if applicable) are met for the broader range(s). If the tests are passed for both the specified range and a narrower range, a reference method determination for the method will include the narrower range as well as the specified range. Appropriate test data shall be submitted for each range sought to be included in a reference or equivalent

method determination under this paragraph (b).

(c) For each performance specification (except Range), the test procedure shall be initially repeated seven (7) times to yield 7 test results. Each result shall be compared with the corresponding specification in table B–1; a value higher than or outside that specified constitutes a failure. These 7 results for each parameter shall be interpreted as follows:

(1) Zero (0) failures: Candidate method passes the performance parameter.

(2) Three (3) or more failures: Candidate method fails the performance parameter.

(3) One (1) or two (2) failures: Repeat the test procedures for the parameter eight (8) additional times yielding a total of fifteen (15) test results. The combined total of 15 test results shall then be interpreted as follows:

(i) One (1) or two (2) failures: Candidate method passes the performance parameter.

(ii) Three (3) or more failures: Candidate method fails the performance parameter.

TABLE B–1—PERFORMANCE SPECIFICATIONS FOR AUTOMATED METHODS

| Performance parameter | Units [1] | Sulfur dioxide | Photochemical oxidants | Carbon monoxide | Nitrogen dioxide | Definitions and test procedures |
|---|---|---|---|---|---|---|
| 1. Range | Parts per million | 0–0.5 | 0–0.5 | 0–50 | 0–0.5 | Sec. 53.23(a). |
| 2. Noise | do | .005 | .005 | .50 | .005 | Sec. 53.23(b). |
| 3. Lower detectable limit | Parts per million | .01 | .01 | 1.0 | .01 | Sec. 53.23(c). |
| 4. Interference equivalent | | | | | | Sec. 53.23(d). |
| Each interferant | Parts per million | ±.02 | ±.02 | ±1.0 | ±0.02 | |
| Total interferant | do | .06 | .06 | 1.5 | .04 | |
| 5. Zero drift, 12 and 24 hour | do | ±.02 | ±.02 | ±1.0 | ±.02 | Sec. 52.23(e). |
| 6. Span drift, 24 hour | | | | | | Do. |
| 20 percent of upper range limit | Percent | ±20.0 | ±20.0 | ±10.0 | ±20.0 | |
| 80 percent of upper range limit | do | ±5.0 | ±5.0 | ±2.5 | ±5.0 | |
| 7. Lag time | Minutes | 20 | 20 | 10 | 20 | Do. |
| 8. Rise time | do | 15 | 15 | 5 | 15 | Do. |
| 9. Fall time | do | 15 | 15 | 5 | 15 | Do. |
| 10. Precision | | | | | | Do. |
| 20 percent of upper range limit | Parts per million | .01 | .01 | .5 | .02 | |
| 80 percent of upper range limit | do | .015 | .01 | .5 | .03 | |

[1] To convert from parts per million to $\mu g/m^3$ at 25 °C and 760 mm Hg, multiply by M/0.02447, where *M* is the molecular weight of the gas.

(d) The tests for *zero drift*, *span drift*, *lag time*, *rise time*, *fall time*, and *precision* shall be combined into a single sequential procedure to be conducted at various line voltages and ambient temperatures specified in § 53.23(e). The tests for *noise*, *lower detectable limit*, and *interference equivalents* shall be made at any temperature between 20 °C. and 30 °C. and at any normal line voltage between 105 and 125 volts, and shall be conducted such that not more than three (3) test results for each parameter are obtained per 24 hours.

(e) All response readings to be recorded shall first be converted to concentration units according to the calibration curve constructed in accordance with § 53.21(b).

(f) All recorder chart tracings, records, test data and other documentation obtained from or pertinent to these tests shall be identified, dated, signed by the analyst performing the test, and submitted.

NOTE: Suggested formats for reporting the test results and calculations are provided in Figures B–2, B–3, B–4, B–5, and B–6 in appendix A. Symbols and abbreviations used in this subpart are listed in table B–5, appendix A.

[40 FR 7049, Feb. 18, 1975, as amended at 40 FR 18168, Apr. 25, 1975; 41 FR 52694, Dec. 1, 1976]

## § 53.21 Test conditions.

(a) *Set-up and start-up* of the test analyzer shall be in strict accordance with the operating instructions specified in the manual referred to in § 53.4(b)(3). Allow adequate warm-up or stabilization time as indicated in the operating instructions before beginning the tests.

If the candidate method does not include an integral strip chart recorder, connect the output signal of the test analyzer to a suitable strip chart recorder of the servo, null-balance type. This recorder shall have a chart width of at least 25 centimeters, chart speeds up to 10 cm per hour, a response time of 1 second or less, a deadband of not more than 0.25 percent of full scale, and capability either of reading measurements at least 5 percent below zero or of offsetting the zero by at least 5 percent.

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

(b) *Calibration* of the test analyzer shall be as indicated in the manual referred to in § 53.4(b)(3) and as follows: If the chart recorder does not have below zero capability, adjust either the controls of the test analyzer or the chart recorder to obtain a +5% offset zero reading on the recorder chart to facilitate observing negative response or drift. If the candidate method is not capable of negative response, the test analyzer (not recorder) shall be operated with an offset zero. Construct and submit a calibration curve showing a plot of recorder scale readings (ordinate) against pollutant concentrations (abscissa). A plot of output units (volts, millivolts, milliamps, etc.) against pollutant concentrations shall also be shown for methods not including an integral chart recorder. All such plots shall consist of at least seven (7) approximately equally spaced, identifiable points, including 0 and 90±5 percent of full scale.

(c) Once the test analyzer has been set up and calibrated and the tests started, manual adjustment or normal periodic maintenance 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 any manual adjustment or periodic maintenance was made and describe the operations performed.

(d) If the test analyzer should malfunction during any of the performance tests, the tests for that parameter shall be repeated. A detailed explanation of the malfunction, remedial action taken, and whether recalibration was necessary (along with all pertinent records and charts) shall be submitted. If more than one malfunction occurs, all performance test procedures for all parameters shall be repeated.

(e) Tests for all performance parameters shall be completed on the same test analyzer, except that use of multiple test analyzers to accelerate testing will be permitted when alternate ranges of a multi-range candidate method are being tested.

### § 53.22 Generation of test atmospheres.

(a) Table B–2 specifies preferred methods for generating test atmospheres and suggested methods of verifying the concentrations. Only one means of establishing the concentration of a test atmosphere is normally required. If the method of generation can produce reproducible concentrations, verification is optional. If the method of generation is not reproducible, then establishment of the concentration by some verification method is required. However, when a method of generation other than that given in table B–2 is used, the test concentration shall be verified.

(b) The test atmosphere delivery system shall be designed and constructed so as not to significantly alter the test atmosphere composition or concentration during the period of the test. The delivery system shall be fabricated from borosilicate glass or FEP Teflon.

(c) The output of the test atmosphere generation system shall be sufficiently stable to obtain stable response during the required tests. If a permeation device is used for generation of a test atmosphere, the device, as well as the air passing over it, shall be controlled to ±0.1 °C.

(d) All diluent air shall be zero air free of contaminants likely to cause a detectable response on the test analyzer.

TABLE B–2—TEST ATMOSPHERES

| Test gas | Generation | Verification |
|---|---|---|
| Ammonia | Permeation device. Similar to system described in references 1 and 2. | Indophenol method, reference 3. |
| Carbon dioxide | Cylinder of zero air or nitrogen containing $CO_2$ as required to obtain the concentration specified in table B–3. | Use NBS-certified standards whenever possible. If NBS standards are not available, obtain 2 standards from independent sources which agree within 2 percent; or obtain one standard and submit it to an independent laboratory for analysis which must agree within 2 percent of the supplier's nominal analysis. |
| Carbon monoxide. | Cylinder of zero air or nitrogen containing CO as required to obtain the concentration specified in table B–3. | Do. |
| Ethane | Cylinder of zero air or nitrogen containing ethane as required to obtain the concentration specified in table B–3. | Do. |
| Ethylene | Cylinder of prepurified nitrogen containing ethylene as required to obtain the concentration specified in table B–3. | Do. |
| Hydrogen chloride. | Cylinder[1] of prepurified nitrogen containing approximately 100 p/m of gaseous HCl. Dilute with zero air to concentration specified in table B–3. | Collect samples in bubbler containing distilled water and analyze by the mercuric thiocyanate method, ASTM (D512), p. 29, reference 4. |
| Hydrogen sulfide. | Permeation device system described in references 1 and 2. | Tentative method of analysis for $H_2$ S content of the atmosphere, p. 426, reference 5. |
| Methane | Cylinder of zero air containing methane as required to obtain the concentration specified in table B–3. | Use NBS-certified standards whenever possible. If NBS standards are not available, obtain 2 standards from independent sources which agree within 2 percent; or obtain one standard and submit it to an independent laboratory for an analysis which must agree within 2 percent of the supplier's nominal analysis. |
| Nitric oxide | Cylinder[1] of prepurified nitrogen containing approximately 100 p/m NO. Dilute with zero air to required concentration. | Gas-phase titration as described in reference 6, section 7.1. |
| Nitrogen dioxide. | 1. Gas phase titration as described in reference 6<br>2. Permeation device, similar to system described in references 1 and 2. | 1. Use an $NO_2$ analyzer calibrated with a gravimetrically calibrated permeation device.<br>2. Use an $NO_2$ analyzer calibrated by gas-phase titration as described in reference 6. |
| Ozone | Calibrated ozone generator as described in reference 7, appendix D. | Use an ozone analyzer calibrated by gas-phase titration as described in reference 6. |
| Sulfur dioxide | Permeation device Similar to system described in reference method for $SO_2$, reference 7, appendix A. | P-rosaniline method. Reference 7, appendix A. |
| Water | Pass zero air through distilled water at a fixed known temperature between 20° and 30 °C. such that the air stream becomes saturated. Dilute with zero air to concentration specified in table B–3. | Measure relative humidity by means of a dew-point indicator, calibrated electrolytic or piezo electric hygrometer, or wet/dry bulb thermometer. |
| Xylene | Cylinder of prepurified nitrogen containing 100 p/m xylene. Dilute with zero air to concentration specified in table B–3. | Use NBS-certified standards whenever possible. If NBS standards are not available, obtain 2 standards from independent sources which agree within 2 percent; or obtain one standard and submit it to an independent laboratory for an analysis which must agree within 2 percent of the supplier's nominal analysis. |
| Zero air | 1. Ambient air purified by appropriate scrubbers or other devices such that it is free of contaminants likely to cause a detectable response on the analyzer.<br>2. Cylinder of compressed zero air certified by the supplier or an independent laboratory to be free of contaminants likely to cause a detectable response on the analyzer. | |

[1] Use stainless steel pressure regulator dedicated to the pollutant measured.

Reference 1. O'Keeffe, A. E., and Ortaman, G. C. ''Primary Standards for Trace Gas Analysis,'' *Anal. Chem.* 38, 760 (1966).
Reference 2. Scaringelli, F. P., A. E., Rosenberg, E., and Bell, J. P., ''Primary Standards for Trace Gas Analysis.'' *Anal. Chem.* 42, 871 (1970).
Reference 3. ''Tentative Method of Analysis for Ammonia in the Atmosphere (Indophenol Method)'', *Health Lab Sciences,* vol. 10, No. 2, 115–118, April 1973.
Reference 4. *1973 Annual Book of ASTM Standards,* American Society for Testing and Materials, 1916 Race St., Philadelphia, PA.
Reference 5. *Methods for Air Sampling and Analysis,* Intersociety Committee, 1972, American Public Health Association, 1015.
Reference 6. *Federal Register,* vol. 38, No. 110, Tentative Method for the Continuous Measurement of Nitrogen Dioxide (Chemiluminescent) addenda C. (June 8, 1973).
Reference 7. *Federal Register,* vol. 36, No. 228, National Primary and Secondary Ambient Air Quality Standards, Nov. 25, 1971.

(e) The concentration of each test atmosphere shall be established and/or verified before or during each series of tests. Samples for verifying test concentrations shall be collected from the test atmosphere delivery system as close as possible to the sample intake port of the test analyzer.

(f) The accuracy of all flow measurements used to calculate test atmosphere concentrations shall be documented and referenced to a primary standard (such as a spirometer, bubble meter, etc.). Any corrections shall be clearly shown. All flow measurements given in volume units shall be standardized to 25 °C. and 760 mm Hg.

(g) Schematic drawings and other information showing complete procedural details of the test atmosphere generation, verification, and delivery system shall be provided. All pertinent calculations shall be clearly indicated.

[40 FR 7049, Feb. 18, 1975, as amended at 40 FR 18168, Apr. 25, 1975]

### § 53.23 Test procedures.

(a) *Range*—(1) *Technical definition*. Nominal minimum and maximum concentrations which a method is capable of measuring.

NOTE: The nominal range is specified at the lower and upper range limits in concentration units, for example, 0–0.5 p/m.

(2) *Test procedure*. Submit a suitable calibration curve, as specified in § 53.21(b), showing the test analyzer's response over at least 95 percent of the required range.

NOTE: A single calibration curve will normally suffice.

(b) *Noise*—(1) *Technical definition*. Spontaneous, short duration deviations in output, about the mean output, which are not caused by input concentration changes. Noise is determined as the standard deviation about the mean and is expressed in concentration units.

(2) *Test procedure*. (i) Allow sufficient time for the test analyzer to warm up and stabilize. Determine at two concentrations, first using zero air and then a pollutant test gas concentration as indicated below. The noise specification in table B–1 shall apply to both of these tests.

(ii) Connect an integrating-type digital meter (DM) suitable for the test analyzer's output and accurate to three significant digits, to measure the analyzer's output signal.

NOTE: Use of a chart recorder in addition to the DM is optional.

(iii) Measure zero air for 60 minutes. During this 60-minute interval, record twenty-five (25) readings at 2-minute intervals. (See Figure B–2 in appendix A.)

(iv) Convert each DM reading to concentration units (p/m) by reference to the test analyzer's calibration curve as determined in § 53.21(b). Label the converted DM readings $r_1$, $r_2$, $r_3$ . . . $r_i$ . . . $r_{25}$.

(v) Calculate the standard deviation, S, as follows:

$$S=\sqrt{\frac{\sum_{i=1}^{25}(r_i)^2-\frac{1}{25}\left(\sum_{i=1}^{25}r_i\right)^2}{24}}\,(p/m)$$

where $i$ indicates the $i$-th DM reading in ppm.

(vi) Let $S$ at 0 ppm be identified as $S_o$; compare $S_o$ to the noise specification given in table B–1.

(vii) Repeat steps (iii) through (vi) of this section using a pollutant test atmosphere concentration of 80±5 percent of the upper range limit (URL) instead of zero gas, and let $S$ at 80 percent of the URL be identified as $S_{80}$. Compare $S_{80}$ to the noise specification given in table B–1.

(viii) Both $S_0$ and $S_{80}$ must be less than or equal to the specification for noise to pass the test for the noise parameter.

(c) *Lower detectable limit*—(1) *Technical definition*. The minimum pollutant concentration which produces a signal of twice the noise level.

(2) *Test procedure*. (i) Allow sufficient time for the test analyzer to warm up and stabilize. Measure zero air and record the stable reading in ppm as $B_Z$. (See Figure B–3 in appendix A.)

(ii) Generate and measure a pollutant test atmosphere concentration equal to the value for the lower detectable limit specified in table B–1.

NOTE: If necessary, the test atmosphere concentration may be generated or verified at a higher concentration, then accurately

diluted with zero air to the final required concentration.

(iii) Record the test analyzer's stable indicated reading, in ppm, as $B_L$.

(iv) Determine the Lower Detectable Limit (LDL) as LDL = $B_L - B_Z$. Compare this LDL value with the noise level, $S_0$, determined in § 53.23(b), for 0 concentration test atmosphere. LDL must be equal to or higher than $2S_0$ to pass this test.

(d) *Interference equivalent*—(1) *Technical definition*. Positive or negative response caused by a substance other than the one being measured.

(2) *Test procedure*. The test analyzer shall be tested for all substances likely to cause a detectable response. The test analyzer shall be challenged, in turn, with each interfering agent specified in table B–3. In the event that there are substances likely to cause a significant interference which have not been specified in table B–3, these substances shall be tested at a concentration substantially higher than that normally found in the ambient air. The interference may be either positive or negative, depending on whether the test analyzer's response is increased or decreased by the presence of the interferent. Interference equivalents shall be determined by mixing each interferent, one at a time, with the pollutant at the concentrations specified in table B–3, and comparing the test analyzer's response to the response caused by the pollutant alone. Known gas-phase reactions that might occur between an interferent and the pollutant are designated by footnote 3 in table B–3. In these cases, the interference equivalent shall be determined in the absence of the pollutant.

(i) Allow sufficient time for warm-up and stabilization of the test analyzer.

(ii) For a candidate method using a prefilter or scrubber based upon a chemical reaction to derive part of its specificity, and which requires periodic service or maintenance, the test analyzer shall be ''conditioned'' prior to each interference test as follows:

TABLE B–3—INTERFERANT TEST CONCENTRATION,[1] PARTS PER MILLION

| Pollutant | Analyzer type[2] | Hydrochloric acid | Ammonia | Hydrogen sulfide | Sulfur dioxide | Nitrogen dioxide | Nitric oxide | Carbon dioxide | Ethylene | Ozone | M-xylene | Water vapor | Carbon monoxide | Methane | Ethane |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $SO_2$ | Flame photometric (FPD) | ..... | ..... | 0.1 | [1] 0.14 | ..... | ..... | 750 | ..... | ..... | ..... | [3] 20,000 | 50 | ..... | ..... |
| $SO_2$ | Gas chromatography (FPD). | ..... | ..... | .1 | [4] .14 | ..... | ..... | 750 | ..... | ..... | ..... | [3] 20,000 | 50 | ..... | ..... |
| $SO_2$ | Spectrophotometric-wet chemical (pararosaniline reaction). | 0.2 | [3] 0.1 | .1 | [4] .14 | 0.5 | ..... | 750 | ..... | 0.5 | ..... | ..... | ..... | ..... | ..... |
| $SO_2$ | Electrochemical | .2 | [3] .1 | .1 | [4] .14 | .5 | 0.5 | ..... | 0.2 | .5 | ..... | [3] 20,000 | ..... | ..... | ..... |
| $SO_2$ | Conductivity | .2 | [3] .1 | ..... | [4] .14 | .5 | ..... | 750 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| $SO_2$ | Spectrophotometric-gas phase. | ..... | ..... | ..... | [4] .14 | .5 | .5 | ..... | ..... | .5 | 0.2 | ..... | ..... | ..... | ..... |
| $O_3$ | Chemiluminescent | ..... | ..... | [3] .1 | ..... | ..... | ..... | 750 | ..... | [4] .08 | ..... | [3] 20,000 | ..... | ..... | ..... |
| $O_3$ | Electrochemical | ..... | [3] .1 | ..... | .5 | .5 | ..... | ..... | ..... | [4] .08 | ..... | [3] 20,000 | ..... | ..... | ..... |
| $O_3$ | Spectrophotometric-wet chemical (potassium iodide reaction). | ..... | [3] .1 | ..... | .5 | .5 | [3] .5 | ..... | ..... | [4] .08 | ..... | ..... | ..... | ..... | ..... |
| $O_3$ | Spectrophotometric-gas phase. | ..... | ..... | ..... | .5 | .5 | [3] .5 | ..... | ..... | [4] .08 | ..... | ..... | ..... | ..... | ..... |
| CO | Infrared | ..... | ..... | ..... | ..... | ..... | ..... | 750 | ..... | ..... | ..... | 20,000 | [4] 10 | ..... | ..... |
| CO | Gas chromatography with flame ionization detector. | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 20,000 | [4] 10 | ..... | 0.5 |
| CO | Electrochemical | ..... | ..... | ..... | ..... | ..... | .5 | ..... | .2 | ..... | ..... | 20,000 | [4] 10 | ..... | ..... |
| CO | Catalytic combustion-thermal detection. | ..... | .1 | ..... | ..... | ..... | ..... | 750 | .2 | ..... | ..... | 20,000 | [4] 10 | 5.0 | .5 |
| CO | IR fluorescence | ..... | ..... | ..... | ..... | ..... | ..... | 750 | ..... | ..... | ..... | 20,000 | [4] 10 | ..... | .5 |
| CO | Mercury replacement UV photometric. | ..... | ..... | ..... | ..... | ..... | ..... | ..... | .2 | ..... | ..... | ..... | [4] 10 | ..... | .5 |
| $NO_2$ | Chemiluminescent | ..... | [3] .1 | ..... | .5 | [4] .1 | .5 | ..... | ..... | ..... | ..... | 20,000 | ..... | ..... | ..... |
| $NO_2$ | Spectrophotometric-wet chemical (azo-dye reaction). | ..... | ..... | ..... | .5 | [4] .1 | .5 | 750 | ..... | .5 | ..... | ..... | ..... | ..... | ..... |
| $NO_2$ | Electrochemical | 0.2 | [3] .1 | ..... | .5 | [4] .1 | .5 | 750 | ..... | .5 | ..... | 20,000 | 50 | ..... | ..... |
| $NO_2$ | Spectrophotometric-gas phase. | ..... | [3] .1 | ..... | .5 | [4] .1 | .5 | ..... | ..... | .5 | ..... | 20,000 | 50 | ..... | ..... |

[1] Concentrations of interferant listed must be prepared and controlled to ±10 percent of the state value.
[2] Analyzer types not listed will be considered by the administrator as special cases.
[3] Do not mix with pollutant.
[4] Concentration of pollutant used for test. These pollutant concentrations must be prepared to ±10 percent of the stated value.

(A) Service or perform the indicated maintenance on the scrubber or prefilter as directed in the manual referred to in § 53.4(b)(3).

(B) Before testing for each interferent, allow the test analyzer to sample through the scrubber a test atmosphere containing the interferent at a concentration equal to the value specified in table B–3. Sampling shall be at the normal flow rate and shall be continued for 6 continuous hours prior to testing.

(iii) Generate three test atmosphere streams as follows:

(A) Test atmosphere *P:* Pollutant concentration.

(B) Test atmosphere *I:* Interference concentration.

(C) Test atmosphere *Z:* Zero air.

(iv) Adjust the individual flow rates and the pollutant or interferent generators for the three test atmospheres as follows:

(A) The flow rates of test atmospheres *I* and *Z* shall be identical.

(B) The concentration of pollutant in test atmosphere *P* shall be adjusted such that when *P* is mixed (diluted) with either test atmosphere *I* or *Z*, the resulting concentration of pollutant shall be as specified in table B–3.

(C) The concentration of interferent in test atmosphere *I* shall be adjusted such that when *I* is mixed (diluted) with test atmosphere *P*, the resulting concentration of interferent shall be equal to the value specified in table B–3.

(D) To minimize concentration errors due to flow rate differences between *I* and *Z*, it is recommended that, when possible, the flow rate of *P* be from 10 to 20 times larger than the flow rates of *I* and *Z*.

(v) Mix test atmospheres *P* and *Z* by passing the total flow of both atmospheres through a mixing flask.

(vi) Sample and measure the mixture of test atmospheres *P* and *Z* with the test analyzer. Allow for a stable reading, and record the reading, in concentration units, as *R* (see Figure B–3).

(vii) Mix test atmospheres *P* and *I* by passing the total flow of both atmospheres through a mixing flask.

(viii) Sample and measure this mixture. Record the stable reading, in concentration units, as $R_I$.

(ix) Calculate the interference equivalent (*IE*) as:

$$IE = R_I - R$$

*IE* must be equal to or less than the specification given in table B–1 for each interferent to pass the test.

(x) Follow steps (iii) through (ix) of this section, in turn, to determine the interference equivalent for each interferent.

(xi) For those interferents which cannot be mixed with the pollutant, as indicated by footnote (3) in table B–3, adjust the concentration of test atmosphere *I* to the specified value without being mixed or diluted by the pollutant test atmosphere. Determine *IE* as follows:

(A) Sample and measure test atmosphere *Z* (zero air). Allow for a stable reading and record the reading, in concentration units, as *R*.

(B) Sample and measure the interferent test atmosphere *I*. If the test analyzer is not capable of negative readings, adjust the analyzer (not the recorder) to give an offset zero. Record the stable reading in concentration units as $R_I$, extrapolating the calibration curve, if necessary, to represent negative readings.

(C) Calculate $IE = R_I - R$. *IE* must be equal to or less than the specification in table B–1 to pass the test.

(xii) Sum the absolute value of all the individual interference equivalents. This sum must be equal to or less than the total interferent specification given in table B–1 to pass the test.

(e) *Zero drift, span drift, lag time, rise time, fall time, and precision*—(1) *Technical definitions*—(i) *Zero drift:* The change in response to zero pollutant concentration, over 12- and 24-hour periods of continuous unadjusted operation.

(ii) *Span drift:* The percent change in response to an up-scale pollutant concentration over a 24-hour period of continuous unadjusted operation.

(iii) *Lag time:* The time interval between a step change in input concentration and the first observable corresponding change in response.

(iv) *Rise time:* The time interval between initial response and 95 percent of final response after a step increase in input concentration.

(v) *Fall time:* The time interval between initial response and 95 percent of final response after a step decrease in input concentration.

(vi) *Precision:* Variation about the mean of repeated measurements of the same pollutant concentration, expressed as one standard deviation about the mean.

(2) Tests for these performance parameters shall be accomplished over a period of seven (7) or more days. During this time, the line voltage supplied to the test analyzer and the ambient temperature surrounding the analyzer shall be varied from day to day. One test result for each performance parameter shall be obtained each test day, for seven (7) or fifteen (15) test days as necessary. The tests are performed sequentially in a single procedure.

(3) The 24-hour test day may begin at any clock hour. The first 12 hours out of each test day are required for testing 12-hour zero drift. Tests for the other parameters shall be conducted during the remaining 12 hours.

(4) Table B–4 specifies the line voltage and room temperature to be used for each test day. The line voltage and temperature shall be changed to the specified values at the start of each test day (i.e., at the start of the 12-hour zero test). Initial adjustments (day zero) shall be made at a line voltage of 115 volts (rms) and a room temperature of 25 °C.

(5) The tests shall be conducted in blocks consisting of 3 test days each until 7 or 15 test results have been obtained. (The final block may contain fewer than three test days.) If a test is interrupted by an occurrence other than a malfunction of the test analyzer, only the block during which the interruption occurred shall be repeated.

(6) During each block, manual adjustments to the electronics, gas, or reagent flows or periodic maintenance shall not be permitted. Automatic adjustments which the test analyzer performs by itself are permitted at any time.

(7) At least 4 hours prior to the start of the first test day of each block, the test analyzer may be adjusted and/or serviced according to the periodic maintenance procedures specified in the manual referred to in §53.4(b)(3). If a new block is to immediately follow a previous block, such adjustments or servicing may be done immediately after completion of the day's tests for the last day of the previous block and at the voltage and temperature specified for that day, but only on test days 3, 6, 9, and 12.

NOTE: If necessary, the beginning of the test days succeeding such maintenance or adjustment may be delayed as necessary to complete the service or adjustment operation.

(8) All response readings to be recorded shall first be converted to concentration units according to the calibration curve. Whenever a test atmosphere is to be measured but a stable reading is not required, the test atmosphere shall be measured long enough to cause a change in response of at least 10% of full scale. Identify all readings and other pertinent data on the strip chart. (See Figure B–1 illustrating the pattern of the required readings.)

TABLE B–4—LINE VOLTAGE AND ROOM TEMPERATURE TEST CONDITIONS

| Test day | Line voltage,[1] rms | Room temperature,[2] °C | Comments |
|---|---|---|---|
| 0 | 115 | 25 | Initial set-up and adjustments. |
| 1 | 125 | 20 | |
| 2 | 105 | 20 | |
| 3 | 125 | 30 | Adjustments and/or periodic maintenance permitted at end of tests. |
| 4 | 105 | 30 | |
| 5 | 125 | 20 | |
| 6 | 105 | 20 | Adjustments and/or periodic maintenance permitted at end of tests. |
| 7 | 125 | 30 | Examine test results to ascertain if further testing is required. |
| 8 | 105 | 30 | |
| 9 | 125 | 20 | Adjustments and/or periodic maintenance permitted at end of tests. |
| 10 | 105 | 20 | |
| 11 | 125 | 30 | |
| 12 | 105 | 30 | Adjustments and/or periodic maintenance permitted at end of tests. |

TABLE B–4—LINE VOLTAGE AND ROOM TEMPERATURE TEST CONDITIONS—Continued

| Test day | Line voltage,[1] rms | Room temperature,[2] °C | Comments |
|---|---|---|---|
| 13 | 125 | 20 | |
| 14 | 105 | 20 | |
| 15 | 125 | 30 | |

[1] Voltage specified shall be controlled to ±1 volt.
[2] Temperature specified shall be controlled to ±1 °C.

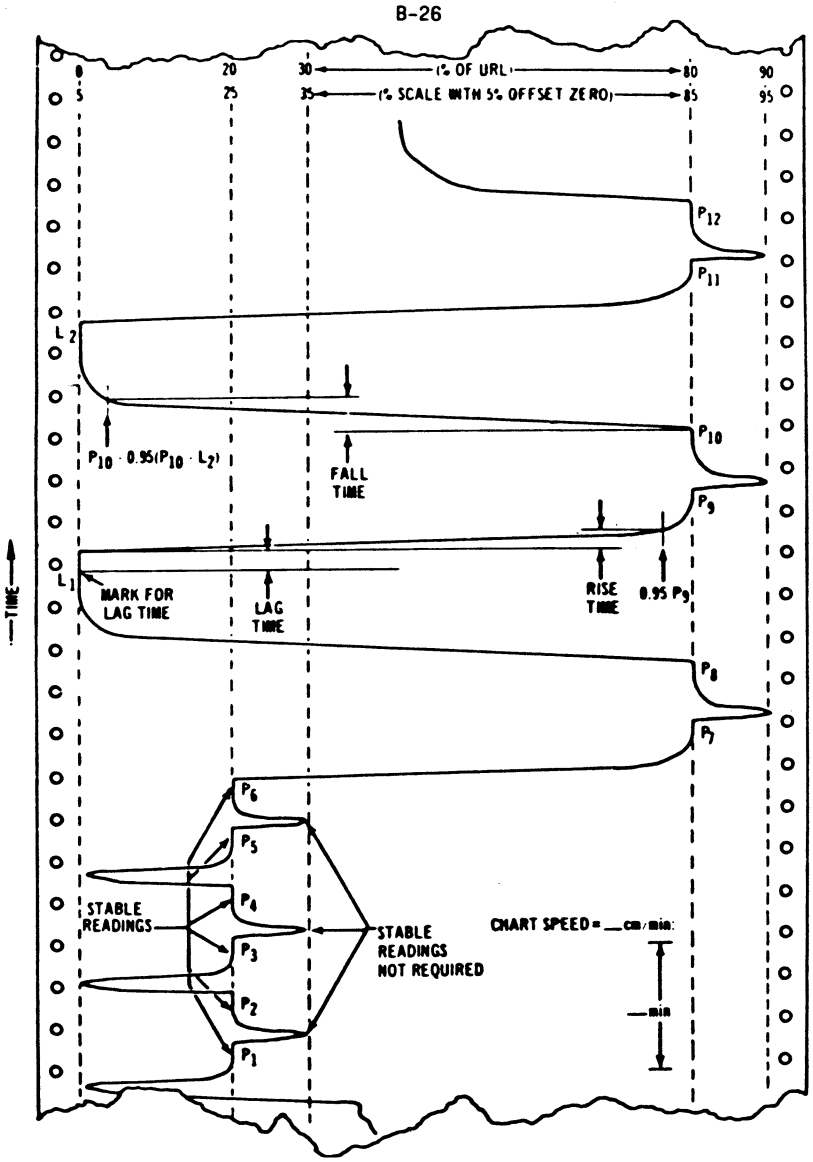



Figure B-1. Example showing the nature of the tracing obtained during the test for drift, lag time, rise time, fall time, and precision. The time scale has been greatly compressed.

(9) *Test procedure.* (i) Arrange to generate pollutant test atmospheres as follows:

| Test atmosphere | Pollutant concentration (percent) |
|---|---|
| $A_0$ | Zero air. |
| $A_{20}$ | 20±5 of the upper range limit. |
| $A_{30}$ | 30±5 of the upper range limit. |

| Test atmosphere | Pollutant concentration (percent) |
|---|---|
| $A_{80}$ | 80±5 of the upper range limit. |
| $A_{90}$ | 90±5 of the upper range limit. |

Test atmospheres $A_0$, $A_{20}$, and $A_{80}$ shall be consistent during the tests and from day to day.

(ii) For steps (xxv) through (xxxi) of this section, a chart speed of at least 10 centimeters per hour shall be used. The actual chart speed, chart speed changes, and time checks shall be clearly marked on the chart.

(iii) Allow sufficient time for test analyzer to warm up and stabilize at a line voltage of 115 volts and a room temperature of 25 °C. Recalibrate, if necessary, and adjust the zero baseline to 5 percent of chart. No further adjustments shall be made to the analyzer until the end of the tests on the third day.

(iv) Measure test atmosphere $A_0$ until a stable reading is obtained, and record this reading (in ppm) as $Z'_n$, where $n$ = 0 (see Figure B–4 in appendix A).

(v) Measure test atmosphere $A_{20}$. Allow for a stable reading and record it as $M'_n$, where $n$ = 0.

(vi) Measure test atmosphere $A_{80}$. Allow for a stable reading and record it as $S'_n$, where $n$ = 0.

(vii) The above readings for $Z'_0$, $M'_0$, and $S'_0$ should be taken at least four (4) hours prior to the beginning of test day 1.

(viii) At the beginning of each test day, adjust the line voltage and room temperature to the values given in table B–4.

(ix) Measure test atmosphere $A_0$ continuously for at least twelve (12) continuous hours during each test day.

(x) After the 12-hour zero drift test (step ix), sample test atmosphere $A_0$. A stable reading is not required.

(xi) Measure test atmosphere $A_{20}$ and record the stable reading (in ppm) as $P_1$. (See Figure B–4 in appendix A.)

(xii) Sample test atmosphere $A_{30}$; a stable reading is not required.

(xiii) Measure test atmosphere $A_{20}$ and record the stable reading as $P_2$.

(xiv) Sample test atmosphere $A_0$; a stable reading is not required.

(xv) Measure test atmosphere $A_{20}$ and record the stable reading as $P_3$.

(xvi) Sample test atmosphere $A_{30}$; a stable reading is not required.

(xvii) Measure test atmosphere $A_{20}$ and record the stable reading as $P_4$.

(xviii) Sample test atmosphere $A_0$; a stable reading is not required.

(xix) Measure test atmosphere $A_{20}$ and record the stable reading as $P_5$.

(xx) Sample test atmosphere $A_{30}$; a stable reading is not required.

(xxi) Measure test atmosphere $A_{20}$ and record the stable reading as $P_6$.

(xxii) Measure test atmosphere $A_{30}$ and record the stable reading as $P_7$.

(xxiii) Sample test atmosphere $A_{90}$; a stable reading is not required.

(xxiv) Measure test atmosphere $A_{80}$ and record the stable reading as $P_8$. Increase chart speed to at least 10 centimeters per hour.

(xxv) Measure test atmosphere $A_0$. Record the stable reading as $L_1$.

(xxvi) Quickly switch the test analyzer to measure test atmosphere $A_{80}$ and mark the recorder chart to show the exact time when the switch occurred.

(xxvii) Measure test atmosphere $A_{90}$ and record the stable reading as $P_{80}$.

(xxviii) Sample test atmosphere $A_{90}$; a stable reading is not required.

(xxix) Measure test atmosphere $A_{80}$ and record the stable reading as $P_{10}$.

(xxx) Measure test atmosphere $A_0$ and record the stable reading as $L_2$.

(xxxi) Measure test atmosphere $A_{80}$ and record the stable reading as $P_{11}$.

(xxxii) Sample test atmosphere $A_{90}$; a stable reading is not required.

(xxxiii) Measure test atmosphere $A_{80}$ and record the stable reading as $P_{12}$.

(xxxiv) Repeat steps (viii) through (xxxiii) of this section, each test day.

(xxxv) If zero and span adjustments are made after the readings are taken on test days 3, 6, 9, or 12, complete all adjustments; then measure test atmospheres $A_0$, $A_{80}$, and $A_{20}$. Allow for a stable reading on each, and record the readings as $Z'_nS'_n$, and $M_n$ respectively, where $n$ = the test day number.

(10) Determine the results of each day's tests as follows. Mark the recorder chart to show readings and determinations.

(i) *Zero drift.* (A) 12-hour. Examine the strip chart pertaining to the 12-

hour continuous zero air test. Determine the minimum (Cmin.) and maximum (Cmax.) readings (in p/m) during this period of 12 consecutive hours, extrapolating the calibration curve to negative concentration units if necessary. Determine the 12-hour zero drift (12*ZD*) as $12ZD = C^{max.} - C^{min.}$. (See Figure B–5 in appendix A.)

(B) Calculate the 24-hour zero drift (24*ZD*) for the *n*-th test day as $24ZD_n = Z_n - Z_{n-1}$, or $24ZD_n = Z_n - Z'_{n-1}$ if zero adjustment was made on the previous day, where $Z_n = \frac{1}{2}(L_1+L_2)$ for $L_1$ and $L_2$ taken on the *n*-th test day.

(C) Compare 12*ZD* and 24*ZD* to the zero drift specification in table B–1. Both 12*ZD* and 24*ZD* must be equal to or less than the specified value to pass the test for zero drift.

(ii) *Span drift*. (A) Span drift at 20 percent of URL (MSD)

$$MSD_n = \frac{M_n - M_{n-1}}{M_{n-1}} \times 100\%$$

$$MSD_n = \frac{M_n - M'_{n-1}}{M'_{n-1}} \times 100\%$$

If span adjustment was made on the previous day, where

$$M_n = \frac{1}{6}\sum_{i=1}^{6} P_i$$

*n* indicates the *n*-th test day, and *i* indicates the *i*-th reading on the *n*-th day.

(B) Span drift at 80 percent of URL (USD):

$$USD_n = \frac{S_n - S_{n-1}}{S_{n-1}} \times 100\%$$

or

$$USD_n = \frac{S_n - S'_{n-1}}{S'_{n-1}} \times 100\%$$

If span adjustment was made on the previous day, where

$$S_n = \frac{1}{6}\sum_{i=7}^{12} P_i$$

*n* indicates the *n*-th test day, and *i* indicates the *i*-th reading on the *n*-th test day.

(C) Both USD and MSD must be equal to or less than the respective specifications given in table B–1 to pass the test for span draft.

(iii) *Lag time*. Determine, from the strip chart, the elapsed time in minutes between the mark made in step (xxvi) and the first observable (two times the noise level) response. This time must be equal to or less than the time specified in table B–1 to pass the test for lag time.

(iv) *Rise time*. Calculate 95 percent of reading $P_9$ and determine from the recorder chart, the elapsed time between the first observable (two times noise level) response and a response equal to 95 percent of the $P_9$ reading. This time must be equal to or less than the rise time specified in table B–1 to pass the test for rise time.

(v) *Fall time*. Calculate five percent of $(P_{10} - L_2)$ and determine, from the strip chart, the elapsed time in minutes between the first observable decrease in response following reading $P_{10}$ and a response equal to five percent of $(P_{10} - L_2)$. This time must be equal to or less than the fall time specification in table B–1 to pass the test for fall time.

(vi) *Precision*. Calculate precision ($P_{20}$ and $P_{80}$) for each day's test as follows:

(A)

$$P_{30} = \sqrt{\frac{1}{5}\left[\sum_{i=1}^{6} P_i^2 - \frac{1}{6}\left(\sum_{i=1}^{6} P_i\right)^2\right]}$$

(B)

$$P_{30} = \sqrt{\frac{1}{5}\left[\sum_{i=7}^{12} P_i^2 - \frac{1}{6}\left(\sum_{i=7}^{12} P_i\right)^2\right]}$$

(C) Both $P_{20}$ and $P_{80}$ must be equal to or less than the specification given in table B–1 to pass the test for precision.

[40 FR 7049, Feb. 18, 1975, as amended at 41 FR 52694, Dec. 1, 1976]

## APPENDIX A TO SUBPART B OF PART 53—OPTIONAL FORMS FOR REPORTING TEST RESULTS

### TABLE B–5—SYMBOLS AND ABBREVIATIONS

| | |
|---|---|
| $B_L$ | Analyzer reading at specified *LDL* concentration. |
| $B_z$ | Analyzer reading at 0 concentration for *LDL* test. |
| *DM* | Digital meter. |
| $C_{max}$ | Maximum analyzer reading during 12*ZD* test. |
| $C_{min}$ | Minimum analyzer reading during 12*ZD* test. |
| *i* | Subscript indicating the *i*-th quantity in a series. |
| *IE* | Interference equivalent. |
| $L_1$ | First analyzer zero reading for 24*ZD* test. |
| $L_2$ | Second analyzer zero reading for 24*ZD* test. |
| $M_n$ | Average of $P_1 \ldots P_6$ for the *n*-th test day. |
| $M'_n$ | Adjusted span reading at 20 percent of *URL* on the *n*-th test day. |
| *MSD* | Span drift at 20 percent of *URL*. |
| *n* | Subscript indicating the test day number. |
| *P* | Analyzer reading for precision test. |
| $P_i$ | The *i*-th analyzer reading for precision test. |

### TABLE B–5—SYMBOLS AND ABBREVIATIONS—Continued

| | |
|---|---|
| $P_{20}$ | Precision at 20 percent of *URL*. |
| $P_{80}$ | Precision at 80 percent of *URL*. |
| *R* | Analyzer reading of pollutant alone for *IE* test. |
| $R_I$ | Analyzer reading with interferent added for *IE* test. |
| $r_i$ | The *i*-th *DM* reading for noise test. |
| *S* | Standard deviation of noise readings. |
| $S_0$ | Noise value (*S*) measured at 0 concentration. |
| $S_{80}$ | Noise value (*S*) measured at 80 percent of *URL*. |
| $S_n$ | Average of $P_7 \ldots P_{12}$ for the *n*-th test day. |
| $S'_n$ | Adjusted span reading at 80 percent of *URL* on the *n*-th test day. |
| *URL* | Upper range limit. |
| *USD* | Span drift at 80 percent o |
| *Z* | Average of $L_1$ and $L_2$. |
| $Z_n$ | Average of $L_1$ and $L_2$ on the *n*-th test day. |
| $Z'_n$ | Adjusted zero reading on the *n*-th test day. |
| *ZD* | Zero drift. |
| 12*ZD* | 12-hour zero drift. |
| 24*ZD* | 24-hour zero drift. |

Applicant _____ Date _____

Test No. _____

Analyzer _____ Range _____

| READING NUMBER (i) | TIME | 0% of URL | | 80% of URL | |
|---|---|---|---|---|---|
| | | DM READING | $r_i$, ppm | DM READING | $r_i$, ppm |
| 1 | | | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | | | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | | | |
| 11 | | | | | |
| 12 | | | | | |
| 13 | | | | | |
| 14 | | | | | |
| 15 | | | | | |
| 16 | | | | | |
| 17 | | | | | |
| 18 | | | | | |
| 19 | | | | | |
| 20 | | | | | |
| 21 | | | | | |
| 22 | | | | | |
| 23 | | | | | |
| 24 | | | | | |
| 25 | | | | | |
| $\sum_{i=1}^{25} r_i$ | | | | | |
| $\sum_{i=1}^{25} r_i^2$ | | | | | |
| S | | | $S_0$ = | | $S_{80}$ = |

Figure B-2. Form for noise data.

Applicant _____

Analyzer _____ Range _____

| TEST PARAMETER | READING OR CALCULATION | TEST NUMBER 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LOWER DETECTABLE LIMIT | $B_Z$ | | | | | | | | | | | | | | | |
| | $B_L$ | | | | | | | | | | | | | | | |
| | $LDL = B_L - B_Z$ | | | | | | | | | | | | | | | |
| INTERFERENCE EQUIVALENT 1 | $R_1$ | | | | | | | | | | | | | | | |
| | $R_{11}$ | | | | | | | | | | | | | | | |
| | $IE_1 = R_{11} - R_1$ | | | | | | | | | | | | | | | |
| 2 | $R_2$ | | | | | | | | | | | | | | | |
| | $R_{12}$ | | | | | | | | | | | | | | | |
| | $IE_2 = R_{12} - R_2$ | | | | | | | | | | | | | | | |
| 3 | $R_3$ | | | | | | | | | | | | | | | |
| | $R_{13}$ | | | | | | | | | | | | | | | |
| | $IE_3 = R_{13} - R_3$ | | | | | | | | | | | | | | | |
| 4 | $R_4$ | | | | | | | | | | | | | | | |
| | $R_{14}$ | | | | | | | | | | | | | | | |
| | $IE_4 = R_{14} - R_4$ | | | | | | | | | | | | | | | |
| 5 | $R_5$ | | | | | | | | | | | | | | | |
| | $R_{15}$ | | | | | | | | | | | | | | | |
| | $IE_5 = R_{15} - R_5$ | | | | | | | | | | | | | | | |
| TOTAL | $IE_T = \sum_{i=1}^{n} \lvert E_i \rvert$ | | | | | | | | | | | | | | | |

Figure B-3. Form for data and calculations for lower detectable limit and interference equivalent.

Applicant _____

Analyzer _____ Range _____

| TEST DAY (n) | ANALYZER READING, ppm | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| DATE | | | | | | | | | | | | | | | | |
| $P_1$ | | | | | | | | | | | | | | | | |
| $P_2$ | | | | | | | | | | | | | | | | |
| $P_3$ | | | | | | | | | | | | | | | | |
| $P_4$ | | | | | | | | | | | | | | | | |
| $P_5$ | | | | | | | | | | | | | | | | |
| $P_6$ | | | | | | | | | | | | | | | | |
| $\sum_{i=1}^{6} P_i^2$ | | | | | | | | | | | | | | | | |
| $P_7$ | | | | | | | | | | | | | | | | |
| $P_8$ | | | | | | | | | | | | | | | | |
| $P_9$ | | | | | | | | | | | | | | | | |
| $P_{10}$ | | | | | | | | | | | | | | | | |
| $P_{11}$ | | | | | | | | | | | | | | | | |
| $P_{12}$ | | | | | | | | | | | | | | | | |
| $\sum_{i=7}^{12} P_i^2$ | | | | | | | | | | | | | | | | |
| $L_1$ | | | | | | | | | | | | | | | | |
| $L_2$ | | | | | | | | | | | | | | | | |
| $Z_n'$ | | | | | | | | | | | | | | | | |
| $M_n'$ | | | | | | | | | | | | | | | | |
| $S_n'$ | | | | | | | | | | | | | | | | |
| $C_{max}$ | | | | | | | | | | | | | | | | |
| $C_{min}$ | | | | | | | | | | | | | | | | |

Figure B-4. Form recording data for drift and precision.

Applicant _____

Analyzer _____ Range _____

| TEST PARAMETER | | CALCULATION | n - th TEST DAY | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| Zero drift | 12 hour | $12ZD = C_{max} - C_{min}$ | | | | | | | | | | | | | | | |
| | 24 hour | $Z = \frac{1}{2}(L_1 + L_2)$ | | | | | | | | | | | | | | | |
| | | $24ZD_n = Z_n - Z_{n-1}$ | | | | | | | | | | | | | | | |
| | | $24ZD_n = Z_n - Z'_{n-1}$ | | | | | | | | | | | | | | | |
| Span drift | 20% URL | $M_n = \frac{1}{6}\sum_{i=1}^{6} P_i$ | | | | | | | | | | | | | | | |
| | | $MSD_n = \frac{M_n - M_{n-1}}{M_{n-1}} \times 100\%$ | | | | | | | | | | | | | | | |
| | | $MSD_n = \frac{M_n - M'_{n-1}}{M'_{n-1}} \times 100\%$ | | | | | | | | | | | | | | | |
| | 80% URL | $S_n = \frac{1}{6}\sum_{i=7}^{12} P_i$ | | | | | | | | | | | | | | | |
| | | $USD_n = \frac{S_n - S_{n-1}}{S_{n-1}} \times 100\%$ | | | | | | | | | | | | | | | |
| | | $USD_n = \frac{S_n - S'_{n-1}}{S'_{n-1}} \times 100\%$ | | | | | | | | | | | | | | | |
| Precision | 20% URL | $P_{20} = \sqrt{\frac{1}{5}\left[\sum_{i=1}^{6} P_i^2 - \frac{1}{6}\left(\sum_{i=1}^{6} P_i\right)^2\right]}$ | | | | | | | | | | | | | | | |
| | 80% URL | $P_{80} = \sqrt{\frac{1}{5}\left[\sum_{i=7}^{12} P_i^2 - \frac{1}{6}\left(\sum_{i=7}^{12} P_i\right)^2\right]}$ | | | | | | | | | | | | | | | |

Figure B-5. Form for calculating zero drift, span drift and precision.

Applicant _____ Analysis _____

Analyzer _____ Range _____

| PERFORMANCE PARAMETER | | Table B-1 spec. | TEST 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | No. of test failures | Pass or fail |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NOISE, ppm | 0% URL ($S_0$) | | | | | | | | | | | | | | | | | | |
| | 80% URL ($S_{80}$) | | | | | | | | | | | | | | | | | | |
| LDL (must be 2 × noised) | | | | | | | | | | | | | | | | | | | |
| INTER-FERENCE EQUIV-ALENT, ppm | $IE_1$ | | | | | | | | | | | | | | | | | | |
| | $IE_2$ | | | | | | | | | | | | | | | | | | |
| | $IE_3$ | | | | | | | | | | | | | | | | | | |
| | $IE_4$ | | | | | | | | | | | | | | | | | | |
| | $IE_5$ | | | | | | | | | | | | | | | | | | |
| | TOTAL ($IE_T$) | | | | | | | | | | | | | | | | | | |
| ZERO DRIFT, ppm | 12 hour (12ZD) | | | | | | | | | | | | | | | | | | |
| | 24 hour (24ZD) | | | | | | | | | | | | | | | | | | |
| SPAN DRIFT, % | 20% URL (MSD) | | | | | | | | | | | | | | | | | | |
| | 80% URL (USD) | | | | | | | | | | | | | | | | | | |
| LAG TIME, min | | | | | | | | | | | | | | | | | | | |
| RISE TIME, min | | | | | | | | | | | | | | | | | | | |
| FALL TIME, min | | | | | | | | | | | | | | | | | | | |
| PRECISION, ppm | 20% URL ($P_{20}$) | | | | | | | | | | | | | | | | | | |
| | 80% URL ($P_{80}$) | | | | | | | | | | | | | | | | | | |

[a]Compare each test LDL reading with the corresponding noise measurements; LDL reading must exceed the 0% URL noise value by a factor of 2 to pass the test for LDL.

Figure B-6. Form for summary of test results.

[40 FR 7049, Feb. 18, 1975, as amended at 40 FR 18169, Apr. 25, 1975]

## Subpart C—Procedures for Determining Comparability Between Candidate Methods and Reference Methods

SOURCE: 71 FR 61278, Oct. 17, 2006, unless otherwise noted.

### §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 6 (reference 1 of appendix A of this subpart).

### § 53.31 [Reserved]

### § 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.

### § 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 ¾ × 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/m$^3$) 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/m$^3$ 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

$$R_{iave} = \frac{R_{iA} + R_{iB} + R_{iC}}{3}$$

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

$$Q_{iave} = \frac{Q_{iA} + Q_{iB} + Q_{iC}}{3}$$

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

$$D_{qi} = \frac{Q_{iave} - T_{qi}}{T_{qi}} \times 100\%$$

(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

$$P_{Ri} = \frac{R_{imax} - R_{imin}}{R_{iave}} \times 100\%$$

*or*

Equation 5

$$P_{Ci} = \frac{C_{imax} - C_{imin}}{C_{iave}} \times 100\%$$

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.

**§ 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 and the requirements of § 53.30(b) 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 $\mu g/m^3$. 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

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

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, $P_{Rj}$, 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 $P_{Rj}$ 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.

**§ 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.* A summary of the test site and seasonal testing requirements is presented in table C–5 of this subpart.

(1) *Test sites.* Comparability testing is required at each of the applicable U.S. 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 temperature, humidity, wind, and elevation. For Class III methods, one test site shall be selected in each of the following four general locations (A, B, C, and D). For Class II methods, two test sites, one western site (A or B) and one midwestern or eastern site (C or D), shall be selected from these locations.

(A) Test site A shall be in the Los Angeles basin or California Central Valley area in a location that is characterized by relatively high $PM_{2.5}$, nitrates, and semi-volatile organic pollutants.

(B) Test site B shall be in a western city such as Denver, Salt Lake City, or Albuquerque in an area characterized by cold weather, higher elevation, winds, and dust.

(C) Test site C shall be in a midwestern city characterized by substantial temperature variation, high nitrates, and wintertime conditions.

(D) Test site D shall be in a northeastern or mid-Atlantic city that is seasonally characterized by high sulfate concentrations and high relative humidity.

(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 four following general locations (A, B, C, and D), and 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 western site (A or B) and one midwestern or eastern site (C or D), shall be selected from these locations.

(A) Test site A shall be in the Los Angeles basin or the California Central Valley area in a location that is characterized by relatively high $PM_{2.5}$, nitrates, and semi-volatile organic pollutants.

(B) Test site B shall be in a western city characterized by a high ratio of $PM_{10-2.5}$ to $PM_{2.5}$, with exposure to windblown dust, such as Las Vegas or Phoenix.

(C) Test site C shall be in a midwestern city characterized by substantial temperature variation, high nitrates, and wintertime conditions.

(D) Test site D shall be in a large city east of the Mississippi River, having characteristically high sulfate concentrations and high humidity levels.

(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 site A, in the winter season only at test sites B and C, and in the summer season only at test site D. (A total of five test campaigns is required.) The summer season shall be defined as the typically warmest three or four months of the year at the site; the winter season shall be defined as the typically coolest three or four months of the year at the site.

(ii) For Class II $PM_{2.5}$ and $PM_{10-2.5}$ candidate methods, one test campaign is required at test site A or B and a second test campaign at test site C or D (total of two 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 $PM_{10-2.5}$ 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 $PM_{10-2.5}$ 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 $PM_{10-2.5}$ measured concentration in $\mu g/m^3$. Guidance and quality assurance procedures applicable to $PM_{2.5}$ or $PM_{10-2.5}$ 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

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

Where:

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

$C_{i,j}$ = The measurement of the candidate method sampler or 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

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

(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

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

(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, $\bar{R}$, using equation 17 of this section:

Equation 17

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

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

Equation 18

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

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

Equation 19

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

Equation 20

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

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

(i) The slope (calculated to at least 2 decimal places) must be in the interval specified for regression slope in table C–4 of this subpart; and

(ii) The intercept (calculated to at least 2 decimal places) 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

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

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

Equation 22

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

(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.

EFFECTIVE DATE NOTE: At 72 FR 32202, June 12, 2007, §53.35 was amended by revising equation 12 of paragraph (d)(4), equation 13 of paragraph (e)(1), equation 15 of paragraph (f)(1), equation 17 of paragraph (g)(1), and equation 21 of paragraph (h)(1), effective Sept. 10, 2007. For the convenience of the user, the revised text is set forth as follows:

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

* * * * *

(d) * * *

(4) * * *

Equation 12

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

Where:

$C_j$ = The mean concentration measured by the candidate method for the measurement set;
$C_{i,j}$ = The measurement of the candidate method sampler or analyzer i on test day j; and
m = The number of valid candidate method measurements in the measurement set (normally 3).

(e) * * *

(1) * * *

Equation 13

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

* * * * *

(f) * * *
(1) * * *

Equation 15

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

* * * * *

(g) * * *
(1) * * *

Equation 17

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

* * * * *

(h) * * *
(1) * * *

Equation 21

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

* * * * *

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 | ..... |

EFFECTIVE DATE NOTE: At 72 FR 32203, June 12, 2007, Table C–1 to subpart C of part 53 was revised, effective Sept. 10, 2007. For the convenience of the user, the revised text is set forth 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 | | | |

| 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 | |
| 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/m³ | 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 OF PART 53—TEST SPECIFICATIONS FOR $PM_{10}$, $PM_{2.5}$ AND $PMR_{10-2.5}$ 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/m³ | 15–300 | 3–200 | 3–200 | 3–200 | 3–200 | 3–200 |
| Minimum number of test sites | 2 | 1 | 2 | 4 | 2 | 4 |
| 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/m³ | 3 | | | | | |
| $R_j$ > 60 μg/m³ | 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/m³ for 24-hr or $R_j$ < 20 μg/m³ for 48-hr samples. | | 3 | | | | |
| $R_j$ > 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 | 23 (46 for two-season sites). | 23 | 23 (46 for two-season sites) |
| Precision of replicate reference method measurements, $P_{Rj}$ or $RP_{Rj'}$, respectively; RP for Class II or III $PM_{2.5}$ or $PM_{10-2.5'}$, 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 $PM_{10-2.5}$ candidate method, CP, each site. | | | 10%[2] | 15%[2] | 15%[2] | 15%[2] |
| Slope of regression relationship | 1±0.10 | 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), but not less than −2.0; and 15.05–(13.20 × slope), but not more than + 2.0. | Between: 62.05–(70.5 × slope), but not less than −3.5; and 78.95–(70.5 × slope), but not more than + 3.5. | Between: 70.50–(82.93 × slope), but not less than −7.0; and 70.50–(61.16 × slope), but not more than + 7.0 |
| Correlation of reference method and candidate method measurements. | ≥0.97 | ≥0.97. | | | | |

[1] Some missing daily measurement values may be permitted; see test procedure.
[2] Calculated as the root mean square over all measurement sets

EFFECTIVE DATE NOTE: At 72 FR 32203, June 12, 2007, Table C–4 to subpart C of part 53 was revised, effective Sept. 10, 2007. For the convenience of the user, the revised text is set forth as follows:

TABLE C–4 TO SUBPART C OF PART 53.—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/m³ | 15–300 | 3–200 | 3–200 | 3–200 | 3–200 | 3–200 |
| Minimum number of test sites | 2 | 1 | 2 | 4 | 2 | 4 |
| 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/m³ | 3 | | | | | |
| $R_j$ > 60 μg/m³ | 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/m³ for 24-hr or $R_j$ < 20 μg/m³ for 48-hr samples. | | 3 | | | | |
| $R_j$ > 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 | 23 (46 for two-season sites) | 23 | 23 (46 for two-season sites) | |
| Precision of replicate reference method measurements, $P_{Rj}$ or $RP_{Rj}$, respectively; RP for Class II or III $PM_{2.5}$ or $PM_{10-2.5}$, 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 $PM_{10-2.5}$ candidate method, CP, each site. | 10%[2] | 15%[2] | 15%[2] | 15%[2] | | |
| Slope of regression relationship. | 1 ± 0.10 | 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), but not less than −2.0; and 15.05 − (13.20 × slope), but not more than +2.0 | Between: 62.05 − (70.5 × slope), but not less than −3.5; and 78.95 − (70.5 × slope), but not more than +3.5 | Between: 70.50 − (82.93 × slope), but not less than −7.0; and 70.50 − (61.16 × slope), but not more than +7.0 |
| 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.

* * * * *

TABLE C–5 TO SUBPART C OF PART 53—SUMMARY OF COMPARABILITY FIELD TESTING CAMPAIGN SITE AND SEASONAL REQUIREMENTS FOR CLASS II AND III FEMS FOR $PM_{10-2.5}$ AND $PM_{2.5}$

| Candidate method | Test site | A | B | C | D |
|---|---|---|---|---|---|
| $PM_{2.5}$ | Test site location area. | Los Angeles basin or California Central Valley. | Western city such as Denver, Salt Lake City, or Albuquerque. | Midwestern city | Northeastern or mid-Atlantic city. |
| | Test site characteristics. | Relatively high $PM_{2.5}$, nitrates, and semi-volatile organic pollutants. | Cold weather, higher elevation, winds, and dust. | Substantial temperature variation, high nitrates, wintertime conditions. | High sulfate and high relative humidity. |
| | *Class III* Field test campaigns (Total: 5). | Winter and summer. | Winter only | Winter only | Summer only. |
| | *Class II* Field test campaigns (Total: 2). | Site A or B, any season | | Site C or D, any season. | |
| $PM_{10-2.5}$ | Test site location area. | Los Angeles basin or California Central Valley. | Western city such as Las Vegas or Phoenix. | Midwestern city | Large city east of the Mississippi River. |
| | Test site characteristics. | Relatively high $PM_{2.5}$, nitrates, and semi-volatile organic pollutants. | High $PM_{10-2.5}$ to $PM_{2.5}$ ratio, wind-blown dust. | Substantial temperature variation, high nitrates, wintertime conditions. | High sulfate and high relative humidity. |
| | *Class III* Field test campaigns (Total: 5). | Winter and summer. | Winter only | Winter only | Summer only. |
| | *Class II* Field test campaigns (Total: 2). | Site A or B, any season | | Site C or D, any season. | |

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 | 1 | | | | | | | |
| _____ ppm | 2 | | | | | | | |
| to _____ ppm | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| Medium | 1 | | | | | | | |
| _____ ppm | 2 | | | | | | | |
| to _____ ppm | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| High | 1 | | | | | | | |
| _____ ppm | 2 | | | | | | | |
| to _____ ppm | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | 7 | | | | | | | |
| | 8 | | | | | | | |
| | | | | | | | Total Failures: | |

EFFECTIVE DATE NOTE: At 72 FR 32204, June 12, 2007, Figure C–1 to subpart C of part 53 was revised, effective Sept. 10, 2007. For the convenience of the user, the revised text is set forth as follows:

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 _____

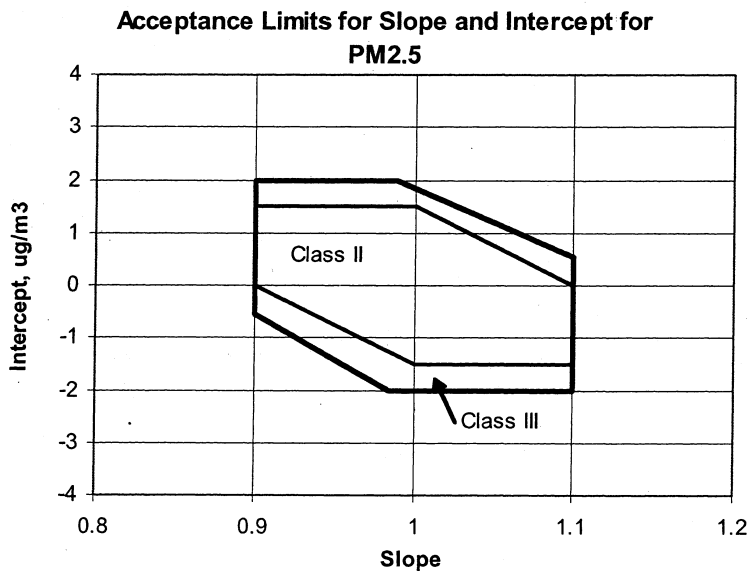
Applicant _____

| 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 | 1 | | | | | | | |
| _____ ppm | 2 | | | | | | | |
| to _____ ppm | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| Medium | 1 | | | | | | | |
| _____ ppm | 2 | | | | | | | |
| to _____ ppm | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| High | 1 | | | | | | | |
| _____ ppm | 2 | | | | | | | |
| to _____ ppm | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | | | | | | |
| | 7 | | | | | | | |
| | 8 | | | | | | | |
| | | | | | | | Total Failures: | |

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-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.




EFFECTIVE DATE NOTE: At 72 FR 32204, June 12, 2007, Figure C–2 to subpart C of part 53 was revised, effective Sept. 10, 2007. For the convenience of the user, the revised text is set forth 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-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.

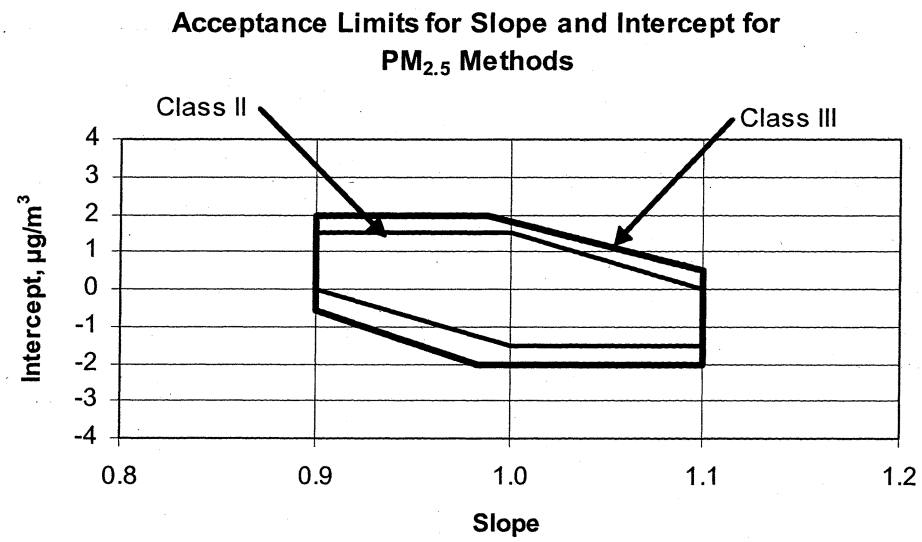
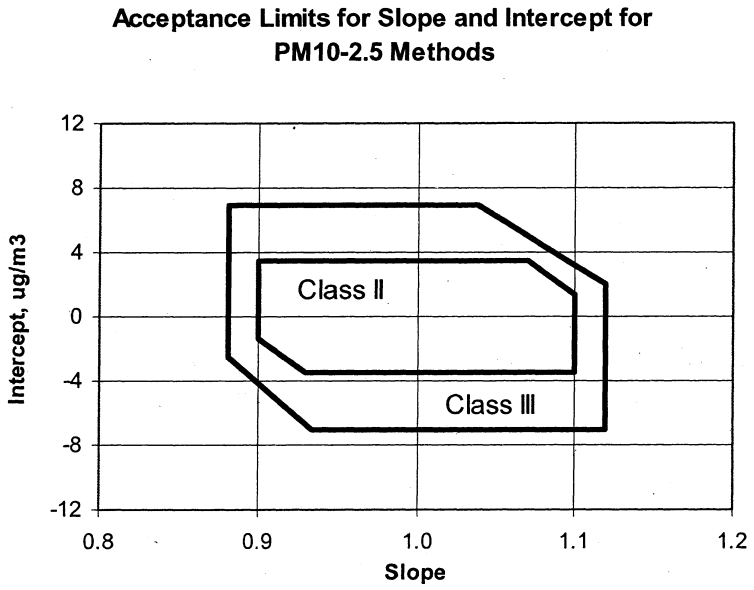


FIGURE C–3 TO SUBPART C OF PART 53—ILLUSTRATION OF THE SLOPE AND INTERCEPT LIMITS FOR CLASS II AND CLASS III $PM_{10-2.5}$ CANDIDATE EQUIVALENT METHODS

FIGURE C-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.




EFFECTIVE DATE NOTE: At 72 FR 32204, June 12, 2007, Figure C–3 to subpart C of part 53 was revised, effective Sept. 10, 2007. For the convenience of the user, the revised text is set forth as follows:

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

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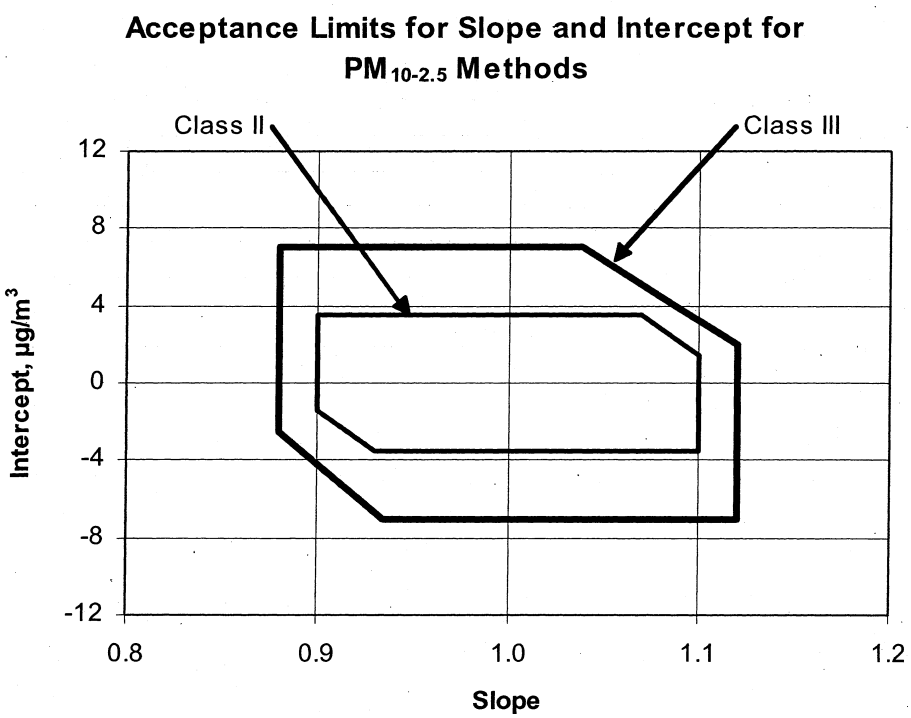
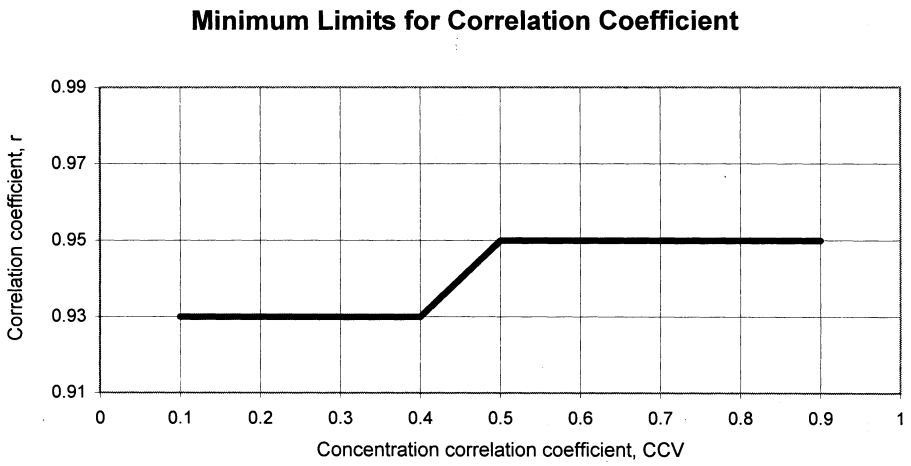


FIGURE C–4 TO SUBPART C OF PART 53—ILLUSTRATION OF THE MINIMUM LIMITS FOR CORRELATION COEFFICIENT FOR $PM_{2.5}$ AND $PM_{10-2.5}$ CLASS II AND III METHODS

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




EFFECTIVE DATE NOTE: At 72 FR 32204, June 12, 2007, Figure C–4 to subpart C of part 53 was revised, effective Sept. 10, 2007. For the convenience of the user, the revised text is set forth as follows:

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

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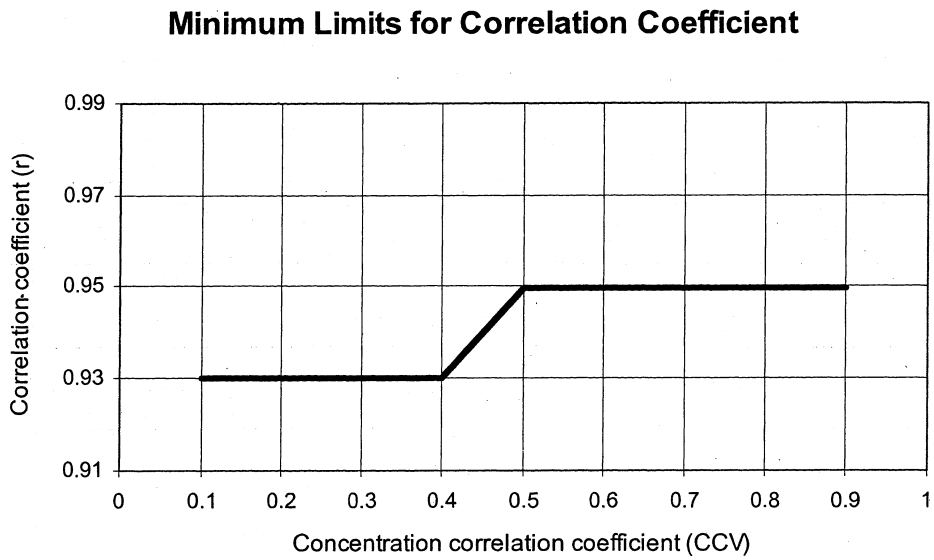


APPENDIX A TO SUBPART C OF PART 53—REFERENCES

(1) American National Standard Quality Systems for Environmental Data and Technology Programs—Requirements with guidance for use, ANSI/ASQC E4–2004. Available from American Society for Quality, P.O. Box 3005, Milwaukee, WI 53202 (*http://qualitypress.asq.org*).

(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 D—Procedures for Testing Performance Characteristics of Methods for $PM_{10}$

SOURCE: 52 FR 24729, July 1, 1987, unless otherwise noted.

### §53.40 General provisions.

(a) The test procedures prescribed in this subpart shall be used to test the performance of candidate methods for $PM_{10}$ against the performance specifications given in table D–1. Except as provided in paragraph (b) of this section, a test sampler or samplers representative of the sampler described in the candidate method must exhibit performance better than, or equal to, the specified value for each performance parameter, to satisfy the requirements of this subpart.

(b) For a candidate method using a $PM_{10}$ sampler previously approved as part of a designated $PM_{10}$ method, only the test for precision need be conducted and passed to satisfy the requirements of this subpart. For a candidate method using a $PM_{10}$ sampler inlet previously approved as part of a designated $PM_{10}$ method, the tests for precision and flow rate stability must be conducted and passed to satisfy the requirements of this subpart; the tests for sampling effectiveness and 50 percent cutpoint need not be conducted if suitable rationale is provided to demonstrate that test results submitted for the previously approved method are applicable to the candidate method.

(c) The liquid particle sampling effectiveness and 50 percent cutpoint of a test sampler shall be determined in a wind tunnel using 10 particle sizes and three wind speeds as specified in table D–2. A minimum of 3 replicate measurements of sampling effectiveness shall be required for each of the 30 test conditions for a minimum of 90 test measurements.

(d) For the liquid particle sampling effectiveness parameter, a smooth curve plot shall be constructed of sampling effectiveness (percent) versus aerodynamic particle diameter (μm) for each of the three wind speeds. These plots shall be used to calculate the expected mass concentration for the test sampler, using the procedure in § 53.43(a). The candidate method passes the liquid particle sampling effectiveness test if the expected mass concentration calculated for the test sampler at each wind speed differs by no more than ±10 percent from that predicted for the ''ideal'' sampler.*

(e) For the 50 percent cutpoint parameter, the test result for each wind speed shall be reported as the particle size at which the curve specified in § 53.40(d) crosses the 50 percent effectiveness line. The candidate method passes the 50 percent cutpoint test if the test result at each wind speed falls within 10±0.5 μm.

(f) The solid particle sampling effectiveness of a test sampler shall be determined in a wind tunnel using 25 μm particles at 2 wind speeds as specified in table D–2. A minimum of three replicate measurements of sampling effectiveness for the 25 μm solid particles shall be required at both wind speeds for a minimum of 6 test measurements.

(g) For the solid particle sampling effectiveness parameter, the test result for each wind speed shall be reported as the difference between the average of the replicate sampling effectiveness measurements obtained for the 25 μm solid particles and the average of the replicate measurements obtained for the 25 μm liquid particles. The candidate method passes the solid particle sampling effectiveness test if the test result for each wind speed is less than, or equal to, 5 percent.

(h) The precision and flow rate stability of three identical test samplers shall be determined at a suitable test site by simultaneously sampling the $PM_{10}$ concentration of the atmosphere for 10 periods of 24 hours.

(i) For the precision parameter, the test result for each of the 10 periods of 24 hours shall be calculated using the procedure in § 53.43(c). The candidate method passes the precision test if all of the test results meet the specifications in table D–1.

(j) For the flow rate stability parameter, the test results for each of the three test samplers and for each of the 10 periods of 24 hours shall be calculated using the procedure in § 53.43(d). The candidate method passes the flow rate stability test if all of the test results meet the specifications in table D–1.

(k) All test data and other documentation obtained from or pertinent to these tests shall be identified, dated, signed by the analyst performing the test, and submitted to EPA.

TABLE D–1—PERFORMANCE SPECIFICATIONS FOR $PM_{10}$ SAMPLERS

| Performance parameter | Units | Specification |
|---|---|---|
| 1. Sampling effectiveness: | | |
| A. Liquid particles | Percent | Such that the expected mass concentration is within ±10 percent of that predicted for the ideal sampler. |
| B. Solid particles | Percent | Sampling effectiveness is no more than 5 percent above that obtained for liquid particles of same size. |

*The sampling effectiveness curve for this ''ideal'' sampler is described by column 5 of table D–3 and is based on a model that approximates the penetration of particles into the human respiratory tract. Additional information on this model may be found in a document entitled, ''Particle Collection Criteria for 10 Micrometer Samplers,'' which is available from the Quality Assurance Division (MD–77), Environmental Monitoring Systems Laboratory, U.S. Environmental Protection Agency, Research Triangle Park, NC 27711.

TABLE D–1—PERFORMANCE SPECIFICATIONS FOR $PM_{10}$ SAMPLERS—Continued

| Performance parameter | Units | Specification |
|---|---|---|
| 2. 50 Percent cutpoint | μm | 10±μ.5 μm aerodynamic diameter. |
| 3. Precision | μg/m³ or percent | 5 μg/m³ or 7 percent for three collocated samplers. |
| 4. Flow rate stability | Percent | Average flow rate over 24 hours within ±5 percent of initial flow rate; all measured flow rates over 24 hours within ±10 percent of initial flow rate. |

## § 53.41 Test conditions.

(a) Set-up and start-up of all test samplers shall be in strict accordance with the operating instructions specified in the manual referred to in § 53.4(b)(3).

(b) If the internal surface or surfaces of the candidate method's sampler inlet on which the particles removed by the inlet are collected is a dry surface (i.e., not normally coated with oil or grease), those surfaces shall be cleaned prior to conducting wind tunnel tests with solid particles.

(c) Once the test sampler or samplers have been set up and the performance tests started, manual adjustment shall be permitted only between test points for the sampling effectiveness and 50 percent cutpoint tests or between test days for the precision and flow rate stability tests. The manual adjustments and any periodic maintenance shall be limited to only those procedures prescribed in the manual referred to in § 53.4(b)(3). The submitted records shall show clearly when any manual adjustment or periodic maintenance was made and shall describe the operations performed.

(d) If a test sampler malfunctions during any of the sampling effectiveness and 50 percent cutpoint tests, that test run shall be repeated. If a test sampler malfunctions during any of the precision and flow rate stability tests, that day's test shall be repeated. A detailed explanation of all malfunctions and the remedial actions taken shall be submitted to EPA with the application.

## § 53.42 Generation of test atmospheres for wind tunnel tests.

(a) A vibrating orifice aerosol generator shall be used to produce monodispersed liquid particles of oleic acid tagged with uranine dye and monodispersed solid particles of ammonium fluoroscein with equivalent aerodynamic diameters as specified in table D–2. The geometric standard deviation for each particle size and type generated shall not exceed 1.1 (for primary particles) and the proportion of multiplets (doublets and triplets) in a test particle atmosphere shall not exceed 10 percent. The particle delivery system shall consist of a blower system and a wind tunnel having a test section of sufficiently large cross-sectional area such that the test sampler, or portion thereof, as installed in the test section for testing, blocks no more than 15 percent of that area. To be acceptable, the blower system must be capable of achieving uniform wind speeds at the speeds specified in table D–2.

TABLE D–2—PARTICLE SIZES AND WIND SPEEDS FOR SAMPLING EFFECTIVENESS TESTS

| Particle size (μm) [a] | Wind speed (km/hr) | | |
|---|---|---|---|
| | 2 | 8 | 24 |
| 3±0.5 | / | / | / |
| 5±0.5 | / | / | / |
| 7±0.5 | / | / | / |
| 9±0.5 | / | / | / |
| 10±0.5 | / | / | / |
| 11±0.5 | / | / | / |
| 13±1.0 | / | / | / |
| 15±1.0 | / | / | / |
| 20±1.0 | / | / | / |
| 25±1.0 | / | /s | /s |

[a] Mass median aerodynamic diameter.
/ = liquid particle.
s=solid particle.
Number of liquid particle test points (minimum of 3 replicates for each combination of particle size and wind speed): 90.
Number of solid particle test points (minimum of 3 replicates for each combination of particle size and wind speed): 6.
Total number of test points: 96.

(b) The size of the test particles delivered to the test section of the wind tunnel shall be established using the operating parameters of the vibrating orifice aerosol generator and shall be verified during the tests by microscopic examination of samples of the particles collected on glass slides or other suitable substrates. When sizing liquid particles on glass slides, the

slides should be pretreated with an oleophobic surfactant and an appropriate flattening factor shall be used in the calculation of aerodynamic diameter. The particle size, as established by the operating parameters of the vibrating orifice aerosol generator, shall be within the tolerance specified in table D–2. The precision of the particle size verification technique shall be 0.5 μm or better, and particle size determined by the verification technique shall not differ by more than 0.5 μm or 10 percent, whichever is higher, from that established by the operating parameters of the vibrating orifice aerosol generator.

(c) The population of multiplets in a test particle atmosphere shall be determined during the tests and shall not exceed 10 percent. Solid particles shall be checked for dryness and evidence of breakage or agglomeration during the microscopic examination. If the solid particles in a test atmosphere are wet or show evidence of significant breakage or agglomeration (μ5 percent), the solid particle test atmosphere is unacceptable for purposes of these tests.

(d) The concentration of particles in the wind tunnel is not critical. However, the cross-sectional uniformity of the particle concentration in the sampling zone of the test section shall be established during the tests using isokinetic samplers. An array of not less than five evenly spaced isokinetic samplers shall be used to determine the particle concentration uniformity in the sampling zone. If the particle concentration measured by any single isokinetic sampler in the sampling zone differs by more than 10 percent from the mean concentration, the particle delivery system is unacceptable in terms of uniformity of particle concentration. The sampling zone shall be a rectangular area having a horizontal dimension not less than 1.2 times the width of the test sampler at its inlet opening and a vertical dimension not less than 25 centimeters. The sampling zone is an area in the test section of the wind tunnel that is horizontally and vertically symmetrical with respect to the test sampler inlet opening.

(e) The wind speed in the wind tunnel shall be determined during the tests using an appropriate technique capable of a precision of 5 percent or better (e.g., hot-wire anemometry). The mean wind speed in the test section of the wind tunnel during the tests shall be within 10 percent of the value specified in table D–2. The wind speed measured at any test point in the test section shall not differ by more than 10 percent from the mean wind speed in the test section. The turbulence intensity (longitudinal component and macroscale) in the test section shall be determined during the tests using an appropriate technique (e.g., hot-wire anemometry).

(f) The accuracy of all flow measurements used to calculate the test atmosphere concentrations and the test results shall be documented to be within ±2 percent, referenced to a primary standard. Any flow measurement corrections shall be clearly shown. All flow measurements shall be given in actual volumetric units.

(g) Schematic drawings of the particle delivery system (wind tunnel and blower system) and other information showing complete procedural details of the test atmosphere generation, verification, and delivery techniques shall be submitted to EPA. All pertinent calculations shall be clearly presented.

### § 53.43 Test procedures.

(a) *Sampling effectiveness*—(1) *Technical definition.* The ratio (expressed as a percentage) of the mass concentration of particles of a given size reaching the sampler filter or filters to the mass concentration of particles of the same size approaching the sampler.

(2) *Test procedure.* (i) Establish a wind speed specified in table D–2 and measure the wind speed and turbulence intensity (longitudinal component and macroscale) at a minimum of 12 test points in a cross-sectional area of the test section of the wind tunnel. The mean wind speed in the test section must be within ±10 percent of the value specified in table D–2 and the variation at any test point in the test section may not exceed 10 percent of the mean.

(ii) Generate particles of a size and type specified in table D–2 using a vibrating orifice aerosol generator. Check for the presence of satellites and adjust the generator as necessary. Calculate the aerodynamic particle size

using the operating parameters of the vibrating orifice aerosol generator and record. The calculated aerodynamic diameter must be within the tolerance specified in table D–2.

(iii) Collect a sample of the particles on a glass slide or other suitable substrate at the particle injection point. If a glass slide is used, it should be pretreated with an appropriate oleophobic surfactant when collecting liquid particles. Use a microscopic technique to size a minimum of 25 primary particles in three viewing fields (do not include multiplets). Determine the geometric mean aerodynamic diameter and geometric standard deviation using the bulk density of the particle type (and an appropriate flattening factor for liquid particles if collected on a glass slide). The measured geometric mean aerodynamic diameter must be within 0.5 μm or 10 percent of the aerodynamic diameter calculated from the operating parameters of the vibrating orifice aerosol generator. The geometric standard deviation must not exceed 1.1.

(iv) Determine the population of multiplets (doublets and triplets) in the collected sample by counting a minimum of 100 particles in three viewing fields. The multiplet population of the particle test atmosphere must not exceed 10 percent.

(v) Introduce the particles into the wind tunnel and allow the particle concentration to stabilize.

(vi) Install an array of five or more evenly spaced isokinetic samplers in the sampling zone (see §53.42(d)) of the wind tunnel. Collect particles on appropriate filters (e.g., glass fiber) over a time period such that the relative error of the measured particle concentration is less than 5 percent. Relative error is defined as (p×100%)/(X), where p is the precision of the fluorometer on the appropriate range, X is the measured concentration, and the units of p and X are the same.

(vii) Determine the quantity of material collected with each isokinetic sampler in the array using a calibrated fluorometer. Calculate and record the mass concentration for each isokinetic sampler as:

$$C_{iso(ij)} = \frac{\text{mass of material collected with isokinetic sampler}}{\text{sample flow rate} \times \text{sampling time}}$$

where

i = replicate number and j = isokinetic sampler number.

(viii) Calculate and record the mean mass concentration as:

$$C_{iso(i)} = \frac{\sum_{j=1}^{n} C_{iso(ij)}}{n}$$

where

n = total number of isokinetic samplers.

(ix) Calculate and record the coefficient of variation of the mass concentration measurements as:

$$CV_{iso(i)} = \sqrt{\frac{\sum_{j=1}^{n} C^2 iso(ij) - \sum_{j=1}^{n} C_{iso(ij)}^{2/n}}{n-1}} \Big/ \overline{C}_{iso(i)}$$

If the value of $CV_{iso(i)}$ exceeds 0.10, the particle concentration uniformity is unacceptable and steps (vi) through (ix) must be repeated. If adjustment of the vibrating orifice aerosol generator or changes in the particle delivery system are necessary to achieve uniformity, steps (ii) through (ix) must be repeated. Remove the array of isokinetic samplers from the wind tunnel. NOTE: A single isokinetic sampler, operated at the same nominal flow rate as the test sampler, may be used in place of the array of isokinetic samplers for the determination of particle mass concentration used in the calculation of sampling effectiveness of the test sampler in step (xiii). In this case, the array of isokinetic samplers must be used to demonstrate particle concentration uniformity prior to the replicate measurements of sampling effectiveness.

(x) If a single isokinetic sampler is used, install the sampler in the wind tunnel with the sampler nozzle centered in the sampling zone (see § 53.42(d)). Collect particles on an appropriate filter (e.g., glass fiber) for a time period such that the relative error of the measured concentration (as defined in step (vi)) is less than 5 percent. Determine the quantity of material collected with the isokinetic sampler using a calibrated fluorometer. Calculate and record the mass concentration as $C_{iso(i)}$ as in step vii. Remove the isokinetic sampler from the wind tunnel.

(xi) Install the test sampler (or portion thereof) in the wind tunnel with the sampler inlet opening centered in the sampling zone (see § 53.42(d)). To meet the maximum blockage limit of § 53.42(a) or for convenience, part of the test sampler may be positioned external to the wind tunnel provided that neither the geometry of the sampler nor the length of any connecting tube or pipe is altered. Collect particles on an appropriate filter or filters (e.g., glass fiber) for a time period such that the relative error of the measured concentration (as defined in step (vi)) is less than 5 percent.

(xii) Determine the quantity of material collected with the test sampler using a calibrated fluorometer. Calculate and record the mass concentration as:

$$C_{sam(i)} = \frac{\text{mass of material collected with test sampler}}{\text{sample flow rate} \times \text{sampling time}}$$

where i=replicate number.

(xiii) Calculate and record the sampling effectiveness of the test sampler as:

$$E_{(i)} = \frac{C_{sam(i)}}{C_{iso(i)}} \times 100\%$$

where i = replicate number.

NOTE: If a single isokinetic sampler is used for the determination of particle mass concentration, replace $C_{iso(i)}$ with $C_{iso(i)}$.

(xiv) Remove the test sampler from the wind tunnel. Repeat steps (vi) through (xiii), as appropriate, to obtain a minimum of three replicate measurements of sampling effectiveness.

(xv) Calculate and record the average sampling effectiveness of the test sampler as:

$$\overline{E} = \frac{\sum_{i=1}^{n} E_{(i)}}{n}$$

where n=number of replicates.

(xvi) Calculate and record the coefficient of variation for the replicate sampling effectiveness measurements of the test sampler as:

$$CV_E = \sqrt{\frac{\sum_{i=1}^{n} E^2{}_{(i)} - \left(\sum_{i=1}^{n} E_{(i)}\right)^{2/n}}{n-1}} \Big/ \overline{E}$$

If the value of $CV_E$ exceeds 0.10, the test run (steps (ii) through (xvi)) must be repeated.

(xvii) Repeat steps i through xvi for each wind speed, particle size, and particle type specified in table D–2.

(xviii) For each of the three wind speeds (nominally 2, 8, and 24 km/hr), correct the liquid particle sampling effectiveness data for the presence of multiplets (doublets and triplets) in the test particle atmospheres.

(xix) For each wind speed, plot the corrected liquid particle sampling effectiveness of the test sampler ($E_{corr}$) as a function of particle size ($d_p$) on semi-logarithmic graph paper where $d_p$ is the particle size established by the operating parameters of the vibrating orifice aerosol generator. Construct a smooth curve through the data.

(xx) For each wind speed, calculate the expected mass concentration for the test sampler under the assumed particle size distribution and compare it to the mass concentration predicted for the ideal sampler, as follows:

(A) Extrapolate the upper and lower ends of the corrected liquid particle sampling effectiveness curve to 100 percent and 0 percent, respectively, using smooth curves. Assume that $E_{corr}$ = 100 percent at a particle size of 1.0 µm and $E_{corr}$ = 0 percent at a particle size of 50 µm.

(B) Determine the value of $E_{corr}$ at each of the particle sizes specified in the first column of table D–3. Record each $E_{corr}$ value as a decimal between 0 and 1 in the second column of table D–3.

(C) Multiply the values of $E_{corr}$ in column 2 by the interval mass concentration values in column 3 and enter the products in column 4 of table D–3.

(D) Sum the values in column 4 and enter the total as the expected mass concentration for the test sampler at the bottom of column 4 of table D–3.

(E) Calculate and record the percent difference in expected mass concentration between the test sampler and the ideal sampler as:

$$\Delta C = \frac{C_{sam(exp)} - C_{ideal(exp)}}{C_{ideal(exp)}} \times 100\%$$

where:

$C_{sam(exp)}$ = expected mass concentration for the test sampler, µg/m³

$C_{ideal(exp)}$ = expected mass concentration for the ideal sampler, µg/m³ (calculated for the ideal sampler and given at the bottom of column 7 of table D–3.)

(F) The candidate method passes the liquid particle sampling effectiveness test if the Δ C value for each wind speed meets the specification in table D–1.

(xxi) For each of the two wind speeds (nominally 8 and 24 km/hr), calculate the difference between the average sampling effectiveness value for the 25 µm solid particles and the average sampling effectiveness value for the 25 µm liquid particles (uncorrected for multiplets).

(xxii) The candidate method passes the solid particle sampling effectiveness test if each such difference meets the specification in table D–1.

TABLE D–3—EXPECTED MASS CONCENTRATION FOR $PM_{10}$ SAMPLERS

| Particle size (um) | Test sampler | | | Ideal Sampler | | |
|---|---|---|---|---|---|---|
| | Sampling effectiveness | Interval mass concentration (µg/m³) | Expected mass concentration (µg/m³) | Sampling effectiveness | Interval mass concentration (µg/m³) | Expected mass concentration (µg/m³) |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| <1.0 | 1.000 | 62.813 | 62.813 | 1.000 | 62.813 | 62.813 |
| 1.5 | | 9.554 | | 0.949 | 9.554 | 9.067 |
| 02.0 | | 2.164 | | 0.942 | 2.164 | 2.038 |
| 02.5 | | 1.785 | | 0.933 | 1.785 | 1.665 |
| 03.0 | | 2.084 | | 0.922 | 2.084 | 1.921 |
| 03.5 | | 2.618 | | 0.909 | 2.618 | 2.380 |
| 04.0 | | 3.211 | | 0.893 | 3.211 | 2.867 |
| 04.5 | | 3.784 | | 0.876 | 3.784 | 3.315 |
| 05.0 | | 4.300 | | 0.857 | 4.300 | 3.685 |
| 05.5 | | 4.742 | | 0.835 | 4.742 | 3.960 |
| 06.0 | | 5.105 | | 0.812 | 5.105 | 4.145 |
| 06.5 | | 5.389 | | 0.786 | 5.389 | 4.236 |
| 07.0 | | 5.601 | | 0.759 | 5.601 | 4.251 |

TABLE D–3—EXPECTED MASS CONCENTRATION FOR $PM_{10}$ SAMPLERS—Continued

| Particle size (um) | Test sampler | | | Ideal Sampler | | |
|---|---|---|---|---|---|---|
| | Sampling effectiveness | Interval mass concentration (μg/m³) | Expected mass concentration (μg/m³) | Sampling effectiveness | Interval mass concentration (μg/m³) | Expected mass concentration (μg/m³) |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| 07.5 | | 5.746 | | 0.729 | 5.746 | 4.189 |
| 08.0 | | 5.834 | | 0.697 | 5.834 | 4.066 |
| 08.5 | | 5.871 | | 0.664 | 5.871 | 3.898 |
| 09.0 | | 5.864 | | 0.628 | 5.864 | 3.683 |
| 09.5 | | 5.822 | | 0.590 | 5.822 | 3.435 |
| 10.0 | | 5.750 | | 0.551 | 5.750 | 3.168 |
| 10.5 | | 5.653 | | 0.509 | 5.653 | 2.877 |
| 11.0 | | 8.257 | | 0.465 | 8.257 | 3.840 |
| 12.0 | | 10.521 | | 0.371 | 10.521 | 3.903 |
| 13.0 | | 9.902 | | 0.269 | 9.902 | 2.664 |
| 14.0 | | 9.250 | | 0.159 | 9.250 | 1.471 |
| 15.0 | | 8.593 | | 0.041 | 8.593 | 0.352 |
| 16.0 | | 7.948 | | 0.000 | 7.948 | 0.000 |
| 17.0 | | 7.329 | | 0.000 | 7.329 | 0.000 |
| 18.0 | | 9.904 | | 0.000 | 9.904 | 0.000 |
| 20.0 | | 11.366 | | 0.000 | 11.366 | 0.000 |
| 22.0 | | 9.540 | | 0.000 | 9.540 | 0.000 |
| 24.0 | | 7.997 | | 0.000 | 7.997 | 0.000 |
| 26.0 | | 6.704 | | 0.000 | 6.704 | 0.000 |
| 28.0 | | 5.627 | | 0.000 | 5.627 | 0.000 |
| 30.0 | | 7.785 | | 0.000 | 7.785 | 0.000 |
| 35.0 | | 7.800 | | 0.000 | 7.800 | 0.000 |
| 40.0 | | 5.192 | | 0.000 | 5.192 | 0.000 |
| 45.0 | | 4.959 | | 0.000 | 4.959 | 0.000 |
| | | $C_{sam(exp)}$ = D | | | $C_{ideal(exp)}$ = | 143.889 |

(b) *50 Percent cutpoint*—(1) *Technical definition*. The particle size for which the sampling effectiveness of the sampler is 50 percent.

(2) *Test procedure*. (i) From the corrected liquid particle sampling effectiveness curves for each of the three wind speeds, determine the particle size at which the curve crosses the 50 percent effectiveness line and record as $D_{50}$ on the corresponding sampling effectiveness plot.

(ii) The candidate method passes the 50 percent cutpoint test if the $D_{50}$ value at each wind speed meets the specification in table D–1.

(c) *Precision*—(1) *Technical definition*. The variation in the measured particle concentration among identical samplers under typical sampling conditions.

(2) *Test procedure*. (i) Set up three identical test samplers at the test site in strict accordance with the instructions in the manual referred to in § 53.4(b)(3). Locate the test sampler inlet openings at the same height and between 2 and 4 meters apart. The samplers shall be oriented in a manner that will minimize spatial and wind directional effects on sample collection. Perform a flow calibration for each test sampler in accordance with the instructions given in the instruction manual and/or appendix J to part 50 of this chapter. Set the operating flow rate to the value prescribed in the sampler instruction manual.

NOTE: For candidate equivalent methods, this test may be used to satisfy part of the requirements of subpart C of this chapter. In that case, three reference method samplers are also used at the test site, measurements with the candidate and reference methods are compared as specified in § 53.34, and the test site must meet the requirements of § 53.30(b).

(ii) Measure the $PM_{10}$ concentration of the atmosphere using the three test samplers for 10 periods (test days) of 24 hours each. On each of the 10 test days, measure the initial and final flow rates of each test sampler. On three of the test days, measure the flow rate of each test sampler after 6, 12, and 18 hours of operation. All measurements of flow rate and mass collected must be

made in accordance with the procedures prescribed in the sampler instruction manual and/or appendix J to part 50 of this chapter. All measurements of flow rate must be in actual volumetric units. Record the $PM_{10}$ concentration for each sampler and each test day as $C_{(i)(j)}$ where i is the sampler number and j is the test day.

(iii) For each test day, calculate and record the average of the three measured $PM_{10}$ concentrations as $C_{(j)}$ where j is the test day. If $C_{(j)}<30\ \mu g/m^3$ for any test day, data from that test day are unacceptable and the tests for that day must be repeated.

(iv) Calculate and record the precision for each of the 10 test days as:

$$P_j = \sqrt{\frac{\sum_{i=1}^{3} C^2{}_{(i)(j)} - \left(\sum_{i=1}^{3} C_{(i)(j)}\right)^2 / 3}{2}}$$

if $\overline{C}j$ is below 80 $\mu g/m^3$, or

$$RP_j = 100\% \times \sqrt{\frac{\sum_{i=1}^{3} C^2{}_{(i)(j)} - \left(\sum_{i=1}^{3} C_{(i)(j)}\right)^2 / 3}{2}} \quad \overline{C}_{(j)}$$

if $\overline{C}j$ is above 80 $\mu g/m^3$.

(v) The candidate method passes the precision test if all 10 $P_j$ or $RP_j$ values meet the specifications in table D–1.

(d) *Flow rate stability*—(1) *Technical definition*. Freedom from variation in the operating flow rate of the sampler under typical sampling conditions.

(2) *Test procedure*. (i) For each of the three test samplers and each of the 10 test days of the precision test, record each measured flow rate as $F_{(i)(j)(t)}$, where i is the sampler number, j is the test day, and t is the time of flow rate measurement (t=0, 6, 12, 18, or 24 hours).

(ii) For each sampler and for each test day, calculate and record the average flow rate as:

$$\overline{F}_{(i)(j)} = \frac{\sum_{t=0}^{24} F_{(i)(j)(t)}}{n}$$

where n = number of flow rate measurements during the 24-hour test day.

(iii) For each sampler and for each test day, calculate and record the percent difference between the average flow rate and the initial flow rate as:

$$\Delta F_{(i)(j)} = \frac{\overline{F}_{(i)(j)} - F_{(i)(j)(0)}}{F_{(i)(j)(0)}} \times 100\%$$

where $F_{(i)(j)(0)}$ is the initial flow rate (t=0).

(iv) For each sampler and for each of the 3 test days on which flow measurements were obtained at 6-hour intervals throughout the 24-hour sampling period, calculate and record the percent differences between each measured flow rate and the initial flow rate as:

$$\Delta F_{(i)(j)(t)} = \frac{F_{(i)(j)} - F_{(i)(j)(0)}}{F_{(i)(j)(0)}} \times 100\%$$

where t = 6, 12, 18, or 24 hours.

(v) The candidate method passes the flow rate stability test if all of the $\Delta F_{(i)(j)}$ and $\Delta F_{(i)(j)(t)}$ values meet the specifications in table D–1.

## Subpart E—Procedures for Testing Physical (Design) and Performance Characteristics of Reference Methods and Class I and Class II Equivalent Methods for $PM_{2.5}$ or $PM_{10-2.5}$

SOURCE: 62 FR 38799, July 18, 1997, unless otherwise noted.

### § 53.50 General provisions.

(a) A candidate method for $PM_{2.5}$ or $PM_{10-2.5}$ described in an application for a FRM or FEM determination submitted under § 53.4 shall be determined by the EPA to be a FRM or a Class I, II, or III FEM 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 $PM_{10-2.5}$ 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) *$PM_{10-2.5}$ methods*—(1) *Reference method.* A sampler associated with a reference method for $PM_{10-2.5}$, 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 $PM_{10-2.5}$ sampler pair shall be verified to be either currently designated under this part 53 as a FRM for $PM_{2.5}$, or shown to meet all requirements for designation as a FRM for $PM_{2.5}$, in accordance with this part 53.

(ii) The $PM_{10C}$ sampler of the $PM_{10-2.5}$ sampler pair shall be verified to be of like manufacturer, design, configuration, and fabrication to the $PM_{2.5}$ sampler of the $PM_{10-2.5}$ 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 $PM_{10-2.5}$ reference method may be determined to be a FRM without further testing.

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

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

(ii) The $PM_{10c}$ sampler of the $PM_{10-2.5}$ sampler pair shall be verified to be of similar design to the $PM_{10-2.5}$ sampler and to meet all requirements for designation as a FRM or Class I FRM 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 $PM_{10-2.5}$ method may be determined to be a Class I FEM without further testing.

(3) *Class II method.* A sampler associated with a Class II candidate equivalent method for $PM_{10-2.5}$ 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 $PM_{10-2.5}$ that have a sample air flow path configuration upstream of the sample filter that is modified from that specified for the FRM 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 FRM and Class I FEM samplers for $PM_{2.5}$. This test requires collocated operation of three candidate method samplers at a field test site. For candidate FEM samplers, this test may be combined and carried out concurrently with the test for comparability to the FRM specified under § 53.34, which requires collocated operation of three FRM samplers and three candidate FEM 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 6) and Part C, (section 7) 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.

[71 FR 61289, Oct. 17, 2006]

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

(a) *Overview.* (1) Paragraphs (a) through (f) of this section specify certain documentation that must be submitted and tests that are required to demonstrate that samplers associated with a designated FRM or FEM for $PM_{2.5}$ or $PM_{10-2.5}$ 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 $PM_{10-2.5}$ 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 FRM 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 $PM_{10-2.5}$ FRM or FEM 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 FRM or FEM 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 FRM or FEM 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 FRM or FEM devices. The completed checklist shall be submitted with the application for FRM or FEM determination.

[71 FR 61290, Oct. 17, 2006]

### § 53.52 Leak check test.

(a) *Overview.* In section 7.4.6 of 40 CFR part 50, appendix L, the sampler is required to include the facility, including components, instruments, operator controls, a written procedure, and other capabilities as necessary, to allow the operator to carry out a leak test of the sampler at a field monitoring site without additional equipment. This test procedure is intended to test the adequacy and effectiveness of the sampler's leak check facility. Because of the variety of potential sampler configurations and leak check procedures possible, some adaptation of this procedure may be necessary to accommodate the specific sampler under test. The test conditions and performance specifications associated with this test are summarized in table E–1 of this subpart. The candidate test sampler must meet all test parameters and test specifications to successfully pass this test.

(b) *Technical definitions.* (1) External leakage includes the total flow rate of external ambient air which enters the sampler other than through the sampler inlet and which passes through

any one or more of the impactor, filter, or flow rate measurement components.

(2) Internal leakage is the total sample air flow rate that passes through the filter holder assembly without passing through the sample filter.

(c) *Required test equipment.* (1) Flow rate measurement device, range 70 mL/min to 130 mL/min, 2 percent certified accuracy, NIST-traceable.

(2) Flow rate measurement adaptor (40 CFR part 50, appendix L, figure L-30) or equivalent adaptor to facilitate measurement of sampler flow rate at the top of the downtube.

(3) Impermeable membrane or disk, 47 mm nominal diameter.

(4) Means, such as a micro-valve, of providing a simulated leak flow rate through the sampler of approximately 80 mL/min under the conditions specified for the leak check in the sampler's leak check procedure.

(5) Teflon sample filter, as specified in section 6 of 40 CFR part 50, appendix L.

(d) *Calibration of test measurement instruments.* Submit documentation showing evidence of appropriately recent calibration, certification of calibration accuracy, and NIST-traceability (if required) of all measurement instruments used in the tests. The accuracy of flow rate meters shall be verified at the highest and lowest pressures and temperatures used in the tests and shall be checked at zero and one or more non-zero flow rates within 7 days of use for this 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.

(2) The flow rate control device shall be set up to provide a constant, controlled flow rate of 80 mL/min into the sampler downtube under the conditions specified for the leak check in the sampler's leak check procedure.

(3) The flow rate measurement device shall be set up to measure the controlled flow rate of 80 mL/min into the sampler downtube under the conditions specified for the leak check in the sampler's leak check procedure.

(f) *Procedure.* (1) Install the impermeable membrane in a filter cassette and install the cassette into the sampler. Carry out the internal leak check procedure as described in the sampler's operation/instruction manual and verify that the leak check acceptance criterion specified in table E–1 of this subpart is met.

(2) Replace the impermeable membrane with a Teflon filter and install the cassette in the sampler. Remove the inlet from the sampler and install the flow measurement adaptor on the sampler's downtube. Close the valve of the adaptor to seal the flow system. Conduct the external leak check procedure as described in the sampler's operation/instruction manual and verify that the leak check acceptance criteria specified in table E–1 of this subpart are met.

(3) Arrange the flow control device, flow rate measurement device, and other apparatus as necessary to provide a simulated leak flow rate of 80 mL/min into the test sampler through the downtube during the specified external leak check procedure. Carry out the external leak check procedure as described in the sampler's operation/instruction manual but with the simulated leak of 80 mL/min.

(g) *Test results.* The requirements for successful passage of this test are:

(1) That the leak check procedure indicates no significant external or internal leaks in the test sampler when no simulated leaks are introduced.

(2) That the leak check procedure properly identifies the occurrence of the simulated external leak of 80 mL/min.

[62 FR 38799, July 18, 1997, as amended at 71 FR 61291, Oct. 17, 2006]

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

(a) *Overview.* This test procedure is designed to evaluate a candidate sampler's flow rate accuracy with respect to the design flow rate, flow rate regulation, flow rate measurement accuracy, coefficient of variability measurement accuracy, and the flow rate

cut-off function. The tests for the first four parameters shall be conducted over a 6-hour time period during which reference flow measurements are made at intervals not to exceed 5 minutes. The flow rate cut-off test, conducted separately, is intended to verify that the sampler carries out the required automatic sample flow rate cut-off function properly in the event of a low-flow condition. The test conditions and performance specifications associated with this test are summarized in table E–1 of this subpart. The candidate test sampler must meet all test parameters and test specifications to successfully pass this test.

(b) *Technical definitions.* (1) Sample flow rate means the quantitative volumetric flow rate of the air stream caused by the sampler to enter the sampler inlet and pass through the sample filter, measured in actual volume units at the temperature and pressure of the air as it enters the inlet.

(2) The flow rate cut-off function requires the sampler to automatically stop sample flow and terminate the current sample collection if the sample flow rate deviates by more than the variation limits specified in table E–1 of this subpart (±10 percent from the nominal sample flow rate) for more than 60 seconds during a sample collection period. The sampler is also required to properly notify the operator with a flag warning indication of the out-of-specification flow rate condition and if the flow rate cut-off results in an elapsed sample collection time of less than 23 hours.

(c) *Required test equipment.* (1) Flow rate meter, suitable for measuring and recording the actual volumetric sample flow rate at the sampler downtube, with a minimum range of 10 to 25 L/min, 2 percent certified, NIST-traceable accuracy. Optional capability for continuous (analog) recording capability or digital recording at intervals not to exceed 30 seconds is recommended. While a flow meter which provides a direct indication of volumetric flow rate is preferred for this test, an alternative certified flow measurement device may be used as long as appropriate volumetric flow rate corrections are made based on measurements of actual ambient temperature and pressure conditions.

(2) Ambient air temperature sensor, with a resolution of 0.1 °C and certified to be accurate to within 0.5 °C (if needed). If the certified flow meter does not provide direct volumetric flow rate readings, ambient air temperature measurements must be made using continuous (analog) recording capability or digital recording at intervals not to exceed 5 minutes.

(3) Barometer, range 600 mm Hg to 800 mm Hg, certified accurate to 2 mm Hg (if needed). If the certified flow meter does not provide direct volumetric flow rate readings, ambient pressure measurements must be made using continuous (analog) recording capability or digital recording at intervals not to exceed 5 minutes.

(4) Flow measurement adaptor (40 CFR part 50, appendix L, figure L-30) or equivalent adaptor to facilitate measurement of sample flow rate at the sampler downtube.

(5) Valve or other means to restrict or reduce the sample flow rate to a value at least 10 percent below the design flow rate (16.67 L/min). If appropriate, the valve of the flow measurement adaptor may be used for this purpose.

(6) Means for creating an additional pressure drop of 55 mm Hg in the sampler to simulate a heavily loaded filter, such as an orifice or flow restrictive plate installed in the filter holder or a valve or other flow restrictor temporarily installed in the flow path near the filter.

(7) Teflon sample filter, as specified in section 6 of 40 CFR part 50, appendix L (if required).

(d) *Calibration of test measurement instruments.* Submit documentation showing evidence of appropriately recent calibration, certification of calibration accuracy, and NIST-traceability (if required) of all measurement instruments used in the tests. The accuracy of flow-rate meters shall be verified at the highest and lowest pressures and temperatures used in the tests and shall be checked at zero and at least one flow rate within ±3 percent of 16.7 L/min within 7 days prior to use for this test. Where an instrument's measurements are to be recorded with

an analog recording device, the accuracy of the entire instrument-recorder system shall be calibrated or verified.

(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.

(2) The inlet of the candidate sampler shall be removed and the flow measurement adaptor installed on the sampler's downtube. A leak check as described in the sampler's operation or instruction manual shall be conducted and must be properly passed before other tests are carried out.

(3) The inlet of the flow measurement adaptor shall be connected to the outlet of the flow rate meter.

(4) For the flow rate cut-off test, the valve or means for reducing sampler flow rate shall be installed between the flow measurement adaptor and the downtube or in another location within the sampler such that the sampler flow rate can be manually restricted during the test.

(f) *Procedure.* (1) Set up the sampler as specified in paragraph (e) of this section and otherwise prepare the sampler for normal sample collection operation as directed in the sampler's operation or instruction manual. Set the sampler to automatically start a 6-hour sample collection period at a convenient time.

(2) During the 6-hour operational flow rate portion of the test, measure and record the sample flow rate with the flow rate meter at intervals not to exceed 5 minutes. If ambient temperature and pressure corrections are necessary to calculate volumetric flow rate, ambient temperature and pressure shall be measured at the same frequency as that of the certified flow rate measurements. Note and record the actual start and stop times for the 6-hour flow rate test period.

(3) Following completion of the 6-hour flow rate test period, install the flow rate reduction device and change the sampler flow rate recording frequency to intervals of not more than 30 seconds. Reset the sampler to start a new sample collection period. Manually restrict the sampler flow rate such that the sampler flow rate is decreased slowly over several minutes to a flow rate slightly less than the flow rate cut-off value (15.0 L/min). Maintain this flow rate for at least 2.0 minutes or until the sampler stops the sample flow automatically. Manually terminate the sample period, if the sampler has not terminated it automatically.

(g) *Test results.* At the completion of the test, validate the test conditions and determine the test results as follows:

(1) *Mean sample flow rate.* (i) From the certified measurements ($Q_{ref}$) of the test sampler flow rate obtained by use of the flow rate meter, tabulate each flow rate measurement in units of L/min. If ambient temperature and pressure corrections are necessary to calculate volumetric flow rate, each measured flow rate shall be corrected using its corresponding temperature and pressure measurement values. Calculate the mean flow rate for the sample period ($Q_{ref,ave}$) as follows:

EQUATION 1

$$Q_{ref,ave} = \frac{\sum_{i=1}^{n} Q_{ref,i}}{n}$$

where:

n equals the number of discrete certified flow rate measurements over the 6-hour test period.

(ii)(A) Calculate the percent difference between this mean flow rate value and the design value of 16.67 L/min, as follows:

EQUATION 2

$$\% \text{ Difference} = \frac{Q_{ref,ave} - 16.67}{16.67} \text{ x } 100\%$$

(B) To successfully pass the mean flow rate test, the percent difference calculated in Equation 2 of this paragraph (g)(1)(ii) must be within ±5 percent.

(2) *Sample flow rate regulation*. (i) From the certified measurements of the test sampler flow rate, calculate the sample coefficient of variation (CV) of the discrete measurements as follows:

EQUATION 3

$$\%CV_{ref} = \frac{1}{Q_{ref,ave}} x \sqrt{\frac{\sum_{i=1}^{n} Q_{ref,i}^2 - \frac{1}{n}\left(\sum_{i-1}^{n} Q_{ref,i}\right)^2}{n-1}} x\ 100\%$$

(ii) To successfully pass the flow rate regulation test, the calculated coefficient of variation for the certified flow rates must not exceed 2 percent.

(3) *Flow rate measurement accuracy*. (i) Using the mean volumetric flow rate reported by the candidate test sampler at the completion of the 6-hour test period ($Q_{ind,ave}$), determine the accuracy of the reported mean flow rate as:

EQUATION 4

$$\%\ \text{Difference} = \frac{|Q_{ind,ave} - Q_{ref,ave}|}{Q_{ref,ave}} x\ 100\%$$

(ii) To successfully pass the flow rate measurement accuracy test, the percent difference calculated in Equation 4 of this paragraph (g)(3) shall not exceed 2 percent.

(4) *Flow rate coefficient of variation measurement accuracy*. (i) Using the flow rate coefficient of variation indicated by the candidate test sampler at the completion of the 6-hour test ($\%CV_{ind}$), determine the accuracy of this reported coefficient of variation as:

EQUATION 5

$$\text{Difference}\ (\%) = |\%CV_{ind} - \%CV_{ref}|$$

(ii) To successfully pass the flow rate CV measurement accuracy test, the absolute difference in values calculated in Equation 5 of this paragraph (g)(4) must not exceed 0.3 (CV%).

(5) *Flow rate cut-off*. (i) Inspect the measurements of the sample flow rate during the flow rate cut-off test and determine the time at which the sample flow rate decreased to a value less than the cut-off value specified in table E–1 of this subpart. To pass this test, the sampler must have automatically stopped the sample flow at least 30 seconds but not more than 90 seconds after the time at which the sampler flow rate was determined to have decreased to a value less than the cut-off value.

(ii) At the completion of the flow rate cut-off test, download the archived data from the test sampler and verify that the sampler's required Flow-out-of-spec and Incorrect sample period flag indicators are properly set.

[62 FR 38799, July 18, 1997, as amended at 71 FR 61291, Oct. 17, 2006]

### § 53.54 Test for proper sampler operation following power interruptions.

(a) *Overview*. (1) This test procedure is designed to test certain performance parameters of the candidate sampler during a test period in which power interruptions of various duration occur. The performance parameters tested are:

(i) Proper flow rate performance of the sampler.

(ii) Accuracy of the sampler's average flow rate, CV, and sample volume measurements.

(iii) Accuracy of the sampler's reported elapsed sampling time.

(iv) Accuracy of the reported time and duration of power interruptions.

(2) This test shall be conducted during operation of the test sampler over a continuous 6-hour test period during which the sampler's flow rate shall be measured and recorded at intervals not to exceed 5 minutes. 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) *Required test equipment*. (1) Flow rate meter, suitable for measuring and

recording the actual volumetric sample flow rate at the sampler downtube, with a minimum range of 10 to 25 L/min, 2 percent certified, NIST-traceable accuracy. Optional capability for continuous (analog) recording capability or digital recording at intervals not to exceed 5 minutes is recommended. While a flow meter which provides a direct indication of volumetric flow rate is preferred for this test, an alternative certified flow measurement device may be used as long as appropriate volumetric flow rate corrections are made based on measurements of actual ambient temperature and pressure conditions.

(2) Ambient air temperature sensor (if needed for volumetric corrections to flow rate measurements), with a resolution of 0.1 °C, certified accurate to within 0.5 °C, and continuous (analog) recording capability or digital recording at intervals not to exceed 5 minutes.

(3) Barometer (if needed for volumetric corrections to flow rate measurements), range 600 mm Hg to 800 mm Hg, certified accurate to 2 mm Hg, with continuous (analog) recording capability or digital recording at intervals not to exceed 5 minutes.

(4) Flow measurement adaptor (40 CFR part 50, appendix L, figure L-30) or equivalent adaptor to facilitate measurement of sample flow rate at the sampler downtube.

(5) Means for creating an additional pressure drop of 55 mm Hg in the sampler to simulate a heavily loaded filter, such as an orifice or flow restrictive plate installed in the filter holder or a valve or other flow restrictor temporarily installed in the flow path near the filter.

(6) Teflon sample filter, as specified in section 6 of 40 CFR part 50, appendix L (if required).

(7) Time measurement system, accurate to within 10 seconds per day.

(c) *Calibration of test measurement instruments.* Submit documentation showing evidence of appropriately recent calibration, certification of calibration accuracy, and NIST-traceability (if required) of all measurement instruments used in the tests. The accuracy of flow rate meters shall be verified at the highest and lowest pressures and temperatures used in the tests and shall be checked at zero and at least one flow rate within ±3 percent of 16.7 L/min within 7 days prior to use for this test. Where an instrument's measurements are to be recorded with an analog recording device, the accuracy of the entire instrument-recorder system shall be calibrated or verified.

(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.

(2) The inlet of the candidate sampler shall be removed and the flow measurement adaptor installed on the sample downtube. A leak check as described in the sampler's operation or instruction manual shall be conducted and must be properly passed before other tests are carried out.

(3) The inlet of the flow measurement adaptor shall be connected to the outlet of the flow rate meter.

(e) *Procedure.* (1) Set up the sampler as specified in paragraph (d) of this section and otherwise prepare the sampler for normal sample collection operation as directed in the sampler's operation or instruction manual. Set the sampler to automatically start a 6-hour sample collection period at a convenient time.

(2) During the entire 6-hour operational flow rate portion of the test, measure and record the sample flow rate with the flow rate meter at intervals not to exceed 5 minutes. If ambient temperature and pressure corrections are necessary to calculate volumetric flow rate, ambient temperature and pressure shall be measured at the same frequency as that of the certified flow rate measurements. Note and record the actual start and stop times for the 6-hour flow rate test period.

(3) During the 6-hour test period, interrupt the AC line electrical power to the sampler 5 times, with durations of 20 seconds, 40 seconds, 2 minutes, 7 minutes, and 20 minutes (respectively), with not less than 10 minutes of normal electrical power supplied between each power interruption. Record the hour and minute and duration of each power interruption.

(4) At the end of the test, terminate the sample period (if not automatically terminated by the sampler) and download all archived instrument data from the test sampler.

(f) *Test results.* At the completion of the sampling period, validate the test conditions and determine the test results as follows:

(1) *Mean sample flow rate.* (i) From the certified measurements ($Q_{ref}$) of the test sampler flow rate, tabulate each flow rate measurement in units of L/min. If ambient temperature and pressure corrections are necessary to calculate volumetric flow rate, each measured flow rate shall be corrected using its corresponding temperature and pressure measurement values. Calculate the mean flow rate for the sample period ($Q_{ref,ave}$) as follows:

EQUATION 6

$$Q_{ref,ave} = \frac{\sum_{i=1}^{n} Q_{ref,i}}{n}$$

where:

n equals the number of discrete certified flow rate measurements over the 6-hour test period, excluding flow rate values obtained during periods of power interruption.

(ii)(A) Calculate the percent difference between this mean flow rate value and the design value of 16.67 L/min, as follows:

EQUATION 7

$$\%\ \text{Difference} = \frac{Q_{ref,ave} - 16.67}{16.67} \text{ x } 100\%$$

(B) To successfully pass this test, the percent difference calculated in Equation 7 of this paragraph (f)(1)(ii) must be within ±5 percent.

(2) *Sample flow rate regulation.* (i) From the certified measurements of the test sampler flow rate, calculate the sample coefficient of variation of the discrete measurements as follows:

EQUATION 8

$$\%CV_{ref} = \frac{1}{Q_{ref,ave}} \text{ x} \sqrt{\frac{\sum_{i=1}^{n} Q_{ref,i}^2 - \frac{1}{n}\left(\sum_{i-1}^{n} Q_{ref,i}\right)^2}{n-1}} \text{ x } 100\%$$

(ii) To successfully pass this test, the calculated coefficient of variation for the certified flow rates must not exceed 2 percent.

(3) *Flow rate measurement accuracy.* (i) Using the mean volumetric flow rate reported by the candidate test sampler at the completion of the 6-hour test ($Q_{ind,ave}$), determine the accuracy of the reported mean flow rate as:

EQUATION 9

$$\%\ \text{Difference} = \frac{|Q_{ind,ave} - Q_{ref,ave}|}{Q_{ref,ave}} \text{ x } 100\%$$

(ii) To successfully pass this test, the percent difference calculated in Equation 9 of this paragraph (f)(3) shall not exceed 2 percent.

(4) *Flow rate CV measurement accuracy.* (i) Using the flow rate coefficient of variation indicated by the candidate test sampler at the completion of the 6-hour test ($\%CV_{ind}$), determine the accuracy of the reported coefficient of variation as:

EQUATION 10

$$\text{Difference}\ (\%) = |\%CV_{ind} - \%CV_{ref}|$$

(ii) To successfully pass this test, the absolute difference in values calculated in Equation 10 of this paragraph (f)(4) must not exceed 0.3 (CV%).

(5) Verify that the sampler properly provided a record and visual display of the correct year, month, day-of-month, hour, and minute with an accuracy of ±2 minutes, of the start of each power interruption of duration greater than 60 seconds.

(6) Calculate the actual elapsed sample time, excluding the periods of electrical power interruption. Verify that

the elapsed sample time reported by the sampler is accurate to within ±20 seconds for the 6-hour test run.

(7) Calculate the sample volume as $Q_{ref,ave}$ multiplied by the sample time, excluding periods of power interruption. Verify that the sample volume reported by the sampler is within 2 percent of the calculated sample volume to successfully pass this test.

(8) Inspect the downloaded instrument data from the test sampler and verify that all data are consistent with normal operation of the sampler.

[62 FR 38799, July 18, 1997; 63 FR 7714, Feb. 17, 1998, as amended at 71 FR 61291, Oct. 17, 2006]

### § 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:

(i) Sample flow rate.

(ii) Flow rate regulation.

(iii) Flow rate measurement accuracy.

(iv) Coefficient of variability measurement accuracy.

(v) Ambient air temperature measurement accuracy.

(vi) Proper operation of the sampler when exposed to power line voltage and ambient temperature extremes.

(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.

(b) *Technical definition*. Sample flow rate means the quantitative volumetric flow rate of the air stream caused by the sampler to enter the sampler inlet and pass through the sample filter, measured in actual volume units at the temperature and pressure of the air as it enters the inlet.

(c) *Required test equipment*. (1) Environmental chamber or other temperature-controlled environment or environments, capable of obtaining and maintaining temperatures at −20 °C and =40 °C as required for the test with an accuracy of ±2 °C. The test environment(s) must be capable of maintaining these temperatures within the specified limits continuously with the additional heat load of the operating test sampler in the environment. Henceforth, where the test procedures specify a test or environmental ''chamber,'' an alternative temperature-controlled environmental area or areas may be substituted, provided the required test temperatures and all other test requirements are met.

(2) Variable voltage AC power transformer, range 100 Vac to 130 Vac, with sufficient current capacity to operate the test sampler continuously under the test conditions.

(3) Flow rate meter, suitable for measuring and recording the actual volumetric sample flow rate at the sampler downtube, with a minimum range of 10 to 25 actual L/min, 2 percent certified, NIST-traceable accuracy. Optional capability for continuous (analog) recording capability or digital recording at intervals not to exceed 5 minutes is recommended. While a flow meter which provides a direct indication of volumetric flow rate is preferred for this test, an alternative certified flow measurement device may be used as long as appropriate volumetric flow rate corrections are made based on measurements of actual ambient temperature and pressure conditions.

(4) Ambient air temperature recorder, range −30 °C to =50 °C, with a resolution of 0.1 °C and certified accurate to within 0.5 °C. Ambient air temperature measurements must be made using continuous (analog) recording capability or digital recording at intervals not to exceed 5 minutes.

(5) Barometer, range 600 mm Hg to 800 mm Hg, certified accurate to 2 mm Hg. If the certified flow rate meter does not provide direct volumetric flow rate readings, ambient pressure measurements must be made using continuous (analog) recording capability or digital recording at intervals not to exceed 5 minutes.

(6) Flow measurement adaptor (40 CFR part 50, appendix L, figure L-30) or equivalent adaptor to facilitate measurement of sampler flow rate at the sampler downtube.

(7) Means for creating an additional pressure drop of 55 mm Hg in the sampler to simulate a heavily loaded filter, such as an orifice or flow restrictive plate installed in the filter holder or a valve or other flow restrictor temporarily installed in the flow path near the filter.

(8) AC RMS voltmeter, accurate to 1.0 volt.

(9) Teflon sample filter, as specified in section 6 of 40 CFR part 50, appendix L (if required).

(d) *Calibration of test measurement instruments.* Submit documentation showing evidence of appropriately recent calibration, certification of calibration accuracy, and NIST-traceability (if required) of all measurement instruments used in the tests. The accuracy of flow rate meters shall be verified at the highest and lowest pressures and temperatures used in the tests and shall be checked at zero and at least one flow rate within ±3 percent of 16.7 L/min within 7 days prior to use for this test. Where an instrument's measurements are to be recorded with an analog recording device, the accuracy of the entire instrument-recorder system shall be calibrated or verified.

(e) *Test setup.* (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.

(2) The inlet of the candidate sampler shall be removed and the flow measurement adaptor installed on the sampler's downtube. A leak check as described in the sampler's operation or instruction manual shall be conducted and must be properly passed before other tests are carried out.

(3) The inlet of the flow measurement adaptor shall be connected to the outlet of the flow rate meter.

(4) The ambient air temperature recorder shall be installed in the test chamber such that it will accurately measure the temperature of the air in the vicinity of the candidate sampler without being unduly affected by the chamber's air temperature control system.

(f) *Procedure.* (1) Set up the sampler as specified in paragraph (e) of this section and otherwise prepare the sampler for normal sample collection operation as directed in the sampler's operation or instruction manual.

(2) The test shall consist of four test runs, one at each of the following conditions of chamber temperature and electrical power line voltage (respectively):

(i) −20 °C ±2 °C and 105 ±1 Vac.

(ii) −20 °C ±2 °C and 125 ±1 Vac.

(iii) =40 °C ±2 °C and 105 ±1 Vac.

(iv) =40 °C ±2 °C and 125 ±1 Vac.

(3) For each of the four test runs, set the selected chamber temperature and power line voltage for the test run. Upon achieving each temperature setpoint in the chamber, the candidate sampler and flow meter shall be thermally equilibrated for a period of at least 2 hours prior to the test run. Following the thermal conditioning time, set the sampler to automatically start a 6-hour sample collection period at a convenient time.

(4) During each 6-hour test period:

(i) Measure and record the sample flow rate with the flow rate meter at intervals not to exceed 5 minutes. If ambient temperature and pressure corrections are necessary to calculate volumetric flow rate, ambient temperature and pressure shall be measured at

the same frequency as that of the certified flow rate measurements. Note and record the actual start and stop times for the 6-hour flow rate test period.

(ii) Determine and record the ambient (chamber) temperature indicated by the sampler and the corresponding ambient (chamber) temperature measured by the ambient temperature recorder specified in paragraph (c)(4) of this section at intervals not to exceed 5 minutes.

(iii) Measure the power line voltage to the sampler at intervals not greater than 1 hour.

(5) At the end of each test run, terminate the sample period (if not automatically terminated by the sampler) and download all archived instrument data from the test sampler.

(g) *Test results*. For each of the four test runs, examine the chamber temperature measurements and the power line voltage measurements. Verify that the temperature and line voltage met the requirements specified in paragraph (f) of this section at all times during the test run. If not, the test run is not valid and must be repeated. Determine the test results as follows:

(1) *Mean sample flow rate*. (i) From the certified measurements ($Q_{ref}$) of the test sampler flow rate, tabulate each flow rate measurement in units of L/min. If ambient temperature and pressure corrections are necessary to calculate volumetric flow rate, each measured flow rate shall be corrected using its corresponding temperature and pressure measurement values. Calculate the mean flow rate for each sample period ($Q_{ref,ave}$) as follows:

EQUATION 11

$$Q_{ref,ave} = \frac{\sum_{i=1}^{n} Q_{ref,i}}{n}$$

where:

n equals the number of discrete certified flow rate measurements over each 6-hour test period.

(ii)(A) Calculate the percent difference between this mean flow rate value and the design value of 16.67 L/min, as follows:

EQUATION 12

$$\%\ \text{Difference} = \frac{Q_{ref,ave} - 16.67}{16.67} \text{ x } 100\%$$

(B) To successfully pass this test, the percent difference calculated in Equation 12 of this paragraph (g)(1)(ii) must be within ±5 percent for each test run.

(2) *Sample flow rate regulation*. (i) From the certified measurements of the test sampler flow rate, calculate the sample coefficient of variation of the discrete measurements as follows:

EQUATION 13

$$\%CV_{ref} = \frac{1}{Q_{ref,ave}} \text{ x } \sqrt{\frac{\sum_{i=1}^{n} Q_{ref,i}^2 - \frac{1}{n}\left(\sum_{i-1}^{n} Q_{ref,i}\right)^2}{n-1}} \text{ x } 100\%$$

(ii) To successfully pass this test, the calculated coefficient of variation for the certified flow rates must not exceed 2 percent.

(3) *Flow rate measurement accuracy*. (i) Using the mean volumetric flow rate reported by the candidate test sampler at the completion of each 6-hour test ($Q_{ind,ave}$), determine the accuracy of the reported mean flow rate as:

EQUATION 14

$$\%\ \text{Difference} = \frac{|Q_{ind,ave} - Q_{ref,ave}|}{Q_{ref,ave}} \text{ x } 100\%$$

(ii) To successfully pass this test, the percent difference calculated in Equation 14 of this paragraph (g)(3) shall not exceed 2 percent for each test run.

(4) *Flow rate coefficient of variation measurement accuracy*. (i) Using the flow rate coefficient of variation indicated by the candidate test sampler ($\%CV_{ind}$), determine the accuracy of the reported coefficient of variation as:

EQUATION 15

$$\text{Difference}\ \% = |\%CV_{ind} - \%CV_{ref}|$$

(ii) To successfully pass this test, the absolute difference calculated in Equation 15 of this paragraph (g)(4) must not exceed 0.3 (CV%) for each test run.

(5) *Ambient temperature measurement accuracy*. (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:

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

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

(ii) The calculated temperature difference must be less than 2 °C for each test run.

(6) *Sampler functionality*. To pass the sampler functionality test, the following two conditions must both be met for each test run:

(i) The sampler must not shutdown during any portion of the 6-hour test.

(ii) An inspection of the downloaded data from the test sampler verifies that all the data are consistent with normal operation of the sampler.

[62 FR 38799, July 18, 1997, as amended at 71 FR 61291, Oct. 17, 2006]

### § 53.56 Test for effect of variations in ambient pressure.

(a) *Overview*. (1) This test procedure is designed to test various sampler performance parameters under variations in ambient (barometric) pressure. Tests shall be conducted in a pressure-controlled environment over two 6-hour time periods during which reference pressure and flow rate measurements shall be made at intervals not to exceed 5 minutes. Specific parameters to be evaluated at operating pressures of 600 and 800 mm Hg are as follows:

(i) Sample flow rate.

(ii) Flow rate regulation.

(iii) Flow rate measurement accuracy.

(iv) Coefficient of variability measurement accuracy.

(v) Ambient pressure measurement accuracy.

(vi) Proper operation of the sampler when exposed to ambient pressure extremes.

(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.

(b) *Technical definition*. Sample flow rate means the quantitative volumetric flow rate of the air stream caused by the sampler to enter the sampler inlet and pass through the sample filter, measured in actual volume units at the temperature and pressure of the air as it enters the inlet.

(c) *Required test equipment*. (1) Hypobaric chamber or other pressure-controlled environment or environments, capable of obtaining and maintaining pressures at 600 mm Hg and 800 mm Hg required for the test with an accuracy of 5 mm Hg. Henceforth, where the test procedures specify a test or environmental chamber, an alternative pressure-controlled environmental area or areas may be substituted, provided the test pressure requirements are met. Means for simulating ambient pressure using a closed-loop sample air system may also be approved for this test; such a proposed method for simulating the test pressure conditions may be described and submitted to EPA at the address given in § 53.4(a) prior to conducting the test for a specific individual determination of acceptability.

(2) Flow rate meter, suitable for measuring and recording the actual volumetric sampler flow rate at the sampler downtube, with a minimum range of 10 to 25 L/min, 2 percent certified, NIST-traceable accuracy. Optional capability for continuous (analog) recording capability or digital recording at intervals not to exceed 5 minutes is recommended. While a flow meter which provides a direct indication of volumetric flow rate is preferred for this test, an alternative certified flow measurement device may be used as long as appropriate volumetric

flow rate corrections are made based on measurements of actual ambient temperature and pressure conditions.

(3) Ambient air temperature recorder (if needed for volumetric corrections to flow rate measurements) with a range −30 °C to =50 °C, certified accurate to within 0.5 °C. If the certified flow meter does not provide direct volumetric flow rate readings, ambient temperature measurements must be made using continuous (analog) recording capability or digital recording at intervals not to exceed 5 minutes.

(4) Barometer, range 600 mm Hg to 800 mm Hg, certified accurate to 2 mm Hg. Ambient air pressure measurements must be made using continuous (analog) recording capability or digital recording at intervals not to exceed 5 minutes.

(5) Flow measurement adaptor (40 CFR part 50, appendix L, figure L–30) or equivalent adaptor to facilitate measurement of sampler flow rate at the sampler downtube.

(6) Means for creating an additional pressure drop of 55 mm Hg in the sampler to simulate a heavily loaded filter, such as an orifice or flow restrictive plate installed in the filter holder or a valve or other flow restrictor temporarily installed in the flow path near the filter.

(7) Teflon sample filter, as specified in section 6 of 40 CFR part 50, appendix L (if required).

(d) *Calibration of test measurement instruments.* Submit documentation showing evidence of appropriately recent calibration, certification of calibration accuracy, and NIST-traceability (if required) of all measurement instruments used in the tests. The accuracy of flow rate meters shall be verified at the highest and lowest pressures and temperatures used in the tests and shall be checked at zero and at least one flow rate within ±3 percent of 16.7 L/min within 7 days prior to use for this test. Where an instrument's measurements are to be recorded with an analog recording device, the accuracy of the entire instrument-recorder system shall be calibrated or verified.

(e) *Test setup.* (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.

(2) The inlet of the candidate sampler shall be removed and the flow measurement adaptor installed on the sampler's downtube. A leak check as described in the sampler's operation or instruction manual shall be conducted and must be properly passed before other tests are carried out.

(3) The inlet of the flow measurement adaptor shall be connected to the outlet of the flow rate meter.

(4) The barometer shall be installed in the test chamber such that it will accurately measure the air pressure to which the candidate sampler is subjected.

(f) *Procedure.* (1) Set up the sampler as specified in paragraph (e) of this section and otherwise prepare the sampler for normal sample collection operation as directed in the sampler's operation or instruction manual.

(2) The test shall consist of two test runs, one at each of the following conditions of chamber pressure:

(i) 600 mm Hg.

(ii) 800 mm Hg.

(3) For each of the two test runs, set the selected chamber pressure for the test run. Upon achieving each pressure setpoint in the chamber, the candidate sampler shall be pressure-equilibrated for a period of at least 30 minutes prior to the test run. Following the conditioning time, set the sampler to automatically start a 6-hour sample collection period at a convenient time.

(4) During each 6-hour test period:

(i) Measure and record the sample flow rate with the flow rate meter at intervals not to exceed 5 minutes. If ambient temperature and pressure corrections are necessary to calculate volumetric flow rate, ambient temperature and pressure shall be measured at

the same frequency as that of the certified flow rate measurements. Note and record the actual start and stop times for the 6-hour flow rate test period.

(ii) Determine and record the ambient (chamber) pressure indicated by the sampler and the corresponding ambient (chamber) pressure measured by the barometer specified in paragraph (c)(4) of this section at intervals not to exceed 5 minutes.

(5) At the end of each test period, terminate the sample period (if not automatically terminated by the sampler) and download all archived instrument data for the test run from the test sampler.

(g) *Test results*. For each of the two test runs, examine the chamber pressure measurements. Verify that the pressure met the requirements specified in paragraph (f) of this section at all times during the test. If not, the test run is not valid and must be repeated. Determine the test results as follows:

(1) *Mean sample flow rate*. (i) From the certified measurements ($Q_{ref}$) of the test sampler flow rate, tabulate each flow rate measurement in units of L/min. If ambient temperature and pressure corrections are necessary to calculate volumetric flow rate, each measured flow rate shall be corrected using its corresponding temperature and pressure measurement values. Calculate the mean flow rate for the sample period ($Q_{ref,ave}$) as follows:

EQUATION 17

$$Q_{ref,ave} = \frac{\sum_{i=1}^{n} Q_{ref,i}}{n}$$

where:

n equals the number of discrete certified flow measurements over the 6-hour test period.

(ii)(A) Calculate the percent difference between this mean flow rate value and the design value of 16.67 L/min, as follows:

EQUATION 18

$$\%\ \text{Difference} = \frac{Q_{ref,ave} - 16.67}{16.67} \text{ x } 100\%$$

(B) To successfully pass this test, the percent difference calculated in Equation 18 of this paragraph (g)(1) must be within ±5 percent for each test run.

(2) *Sample flow rate regulation*. (i) From the certified measurements of the test sampler flow rate, calculate the sample coefficient of variation of the discrete measurements as follows:

EQUATION 19

$$\%CV_{ref} = \frac{1}{Q_{ref,ave}} \text{ x} \sqrt{\frac{\sum_{i=1}^{n} Q_{ref,i}^2 - \frac{1}{n}\left(\sum_{i-1}^{n} Q_{ref,i}\right)^2}{n-1}} \text{ x } 100\%$$

(ii) To successfully pass this test, the calculated coefficient of variation for the certified flow rates must not exceed 2 percent.

(3) *Flow rate measurement accuracy*. (i) Using the mean volumetric flow rate reported by the candidate test sampler at the completion of each 6-hour test ($Q_{ind,ave}$), determine the accuracy of the reported mean flow rate as:

EQUATION 20

$$\%\ \text{Difference} = \frac{|Q_{ind,ave} - Q_{ref,ave}|}{Q_{ref,ave}} \text{ x } 100\%$$

(ii) To successfully pass this test, the percent difference calculated in Equation 20 of this paragraph (g)(3) shall not exceed 2 percent for each test run.

(4) *Flow rate CV measurement accuracy*. (i) Using the flow rate coefficient of variation indicated by the candidate test sampler at the completion of the 6-hour test ($\%CV_{ind}$), determine the accuracy of the reported coefficient of variation as:

EQUATION 21

$$\text{Difference}\ (\%) = |\%CV_{ind} - \%CV_{ref}|$$

(ii) To successfully pass this test, the absolute difference in values calculated in Equation 21 of this paragraph (g)(4) must not exceed 0.3 (CV%) for each test run.

(5) *Ambient pressure measurement accuracy*. (i) Calculate the absolute difference between the mean ambient air pressure indicated by the test sampler and the ambient (chamber) air pressure measured with the reference barometer as:

EQUATION 22

$$P_{diff} = |P_{ind,ave} - P_{ref,ave}|$$

where:

$P_{ind,ave}$ = mean ambient pressure indicated by the test sampler, mm Hg; and

$P_{ref,ave}$ = mean barometric pressure measured by the reference barometer, mm Hg.

(ii) The calculated pressure difference must be less than 10 mm Hg for each test run to pass the test.

(6) *Sampler functionality*. To pass the sampler functionality test, the following two conditions must both be met for each test run:

(i) The sampler must not shut down during any part of the 6-hour tests; and

(ii) An inspection of the downloaded data from the test sampler verifies that all the data are consistent with normal operation of the sampler.

[62 FR 38799, July 18, 1997; 63 FR 7714, Feb. 17, 1998, as amended at 71 FR 61292, Oct. 17, 2006]

### § 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.

(c) *Required test equipment*. (1) Environmental chamber providing the means, such as a bank of solar-spectrum lamps, for generating or simulating thermal radiation in approximate spectral content and intensity equivalent to solar insulation of 1000 ±50 W/m$^2$ inside the environmental chamber. To properly simulate the sun's radiative effects on the sampler, the solar bank must provide the spectral energy distribution and permitted tolerances specified in table E–2 of this subpart. The solar radiation source area shall be such that the width of the candidate sampler shall not exceed one-half the dimensions of the solar bank. The solar bank shall be located a minimum of 76 cm (30 inches) from any surface of the candidate sampler. To meet requirements of the solar radiation tests, the chamber's internal volume shall be a minimum of 10 times that of the volume of the candidate sampler. Air velocity in the region of the sampler must be maintained continuously during the radiative tests at 2.0 ±0.5 m/sec.

(2) Ambient air temperature recorder, range −30 °C to =50 °C, with a resolution of 0.1 °C and certified accurate to within 0.5 °C. Ambient air temperature measurements must be made using continuous (analog) recording capability or digital recording at intervals not to exceed 5 minutes.

(3) Flow measurement adaptor (40 CFR part 50, appendix L, figure L-30) or equivalent adaptor to facilitate measurement of sampler flow rate at the sampler downtube.

(4) Miniature temperature sensor(s), capable of being installed in the sampler without introducing air leakage and capable of measuring the sample air temperature within 1 cm of the center of the filter, downstream of the filter; with a resolution of 0.1 °C, certified accurate to within 0.5 °C, NIST-traceable, with continuous (analog) recording capability or digital recording at intervals of not more than 5 minutes.

(5) Solar radiometer, to measure the intensity of the simulated solar radiation in the test environment, range of 0 to approximately 1500 W/m$^2$. Optional capability for continuous (analog) recording or digital recording at intervals not to exceed 5 minutes is recommended.

(6) Sample filter or filters, as specified in section 6 of 40 CFR part 50, appendix L.

(d) *Calibration of test measurement instruments.* Submit documentation showing evidence of appropriately recent calibration, certification of calibration accuracy, and NIST-traceability (if required) of all measurement instruments used in the tests. The accuracy of flow rate meters shall be verified at the highest and lowest pressures and temperatures used in the tests and shall be checked at zero and at least one flow rate within ±3 percent of 16.7 L/min within 7 days prior to use for this test. Where an instrument's measurements are to be recorded with an analog recording device, the accuracy of the entire instrument-recorder system shall be calibrated or verified.

(e) *Test setup.* (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 five additional filters for magazine-type sequential samplers) as directed by the sampler's operation or instruction manual.

(2) The miniature temperature sensor shall be temporarily installed in the test sampler such that it accurately measures the air temperature 1 cm from the center of the filter on the downstream side of the filter. The sensor shall be installed such that no external or internal air leakage is created by the sensor installation. The sensor's dimensions and installation shall be selected to minimize temperature measurement uncertainties due to thermal conduction along the sensor mounting structure or sensor conductors. For sequential samplers, similar temperature sensors shall also be temporarily installed in the test sampler to monitor the temperature 1 cm from the center of each filter stored in the sampler for sequential sample operation.

(3) The solar radiant energy source shall be installed in the test chamber such that the entire test sampler is irradiated in a manner similar to the way it would be irradiated by solar radiation if it were located outdoors in an open area on a sunny day, with the radiation arriving at an angle of between 30° and 45° from vertical. The intensity of the radiation received by all sampler surfaces that receive direct radiation shall average 1000 ±50 W/m$^2$, measured in a plane perpendicular to the incident radiation. The incident radiation shall be oriented with respect to the sampler such that the area of the sampler's ambient temperature sensor (or temperature shield) receives full, direct radiation as it would or could during normal outdoor installation. Also, the temperature sensor must not be shielded or shaded from the radiation by a sampler part in a way that would not occur at other normal insulation angles or directions.

(4) The solar radiometer shall be installed in a location where it measures thermal radiation that is generally

representative of the average thermal radiation intensity that the upper portion of the sampler and sampler inlet receive. The solar radiometer shall be oriented so that it measures the radiation in a plane perpendicular to its angle of incidence.

(5) The ambient air temperature recorder shall be installed in the test chamber such that it will accurately measure the temperature of the air in the chamber without being unduly affected by the chamber's air temperature control system or by the radiant energy from the solar radiation source that may be present inside the test chamber.

(f) *Procedure*. (1) Set up the sampler as specified in paragraph (e) of this section and otherwise prepare the sampler for normal sample collection operation as directed in the sampler's operation or instruction manual.

(2) Remove the inlet of the candidate test sampler and install the flow measurement adaptor on the sampler's downtube. Conduct a leak check as described in the sampler's operation or instruction manual. The leak test must be properly passed before other tests are carried out.

(3) Remove the flow measurement adaptor from the downtube and re-install the sampling inlet.

(4) Activate the solar radiation source and verify that the resulting energy distribution prescribed in table E–2 of this subpart is achieved.

(5) Program the test sampler to conduct a single sampling run of 4 continuous hours. During the 4-hour sampling run, measure and record the radiant flux, ambient temperature, and filter temperature (all filter temperatures for sequential samplers) at intervals not to exceed 5 minutes.

(6) At the completion of the 4-hour sampling phase, terminate the sample period, if not terminated automatically by the sampler. Continue to measure and record the radiant flux, ambient temperature, and filter temperature or temperatures for 4 additional hours at intervals not to exceed 5 minutes. At the completion of the 4-hour post-sampling period, discontinue the measurements and turn off the solar source.

(7) Download all archived sampler data from the test run.

(g) *Test results*. Chamber radiant flux control. Examine the continuous record of the chamber radiant flux and verify that the flux met the requirements specified in table E–2 of this subpart at all times during the test. If not, the entire test is not valid and must be repeated.

(1) *Filter temperature measurement accuracy*. (i) For each 4-hour test period, calculate the absolute value of the difference between the mean filter temperature indicated by the sampler (active filter) and the mean filter temperature measured by the reference temperature sensor installed within 1 cm downstream of the (active) filter as:

EQUATION 23

$$T_{diff,filter} = |T_{ind,filter} - T_{ref,filter}|$$

where:

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

$T_{ref,filter}$ = mean filter temperature measured by the reference temperature sensor, °C.

(ii) To successfully pass the indicated filter temperature accuracy test, the calculated difference between the measured means ($T_{diff,filter}$) must not exceed 2 °C for each 4-hour test period.

(2) *Ambient temperature measurement accuracy*. (i) For each 4-hour test period, calculate the absolute value of the difference between the mean ambient air temperature indicated by the test sampler and the mean ambient air temperature measured by the reference ambient air temperature recorder as:

EQUATION 24

$$T_{diff,ambient} = |T_{ind,ambient} - T_{ref,ambient}|$$

where:

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

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

(ii) To successfully pass the indicated ambient temperature accuracy test, the calculated difference between the measured means ($T_{diff,ambient}$) must not exceed 2 °C for each 4-hour test period.

(3) *Filter temperature control accuracy.* (i) For each temperature measurement interval over each 4-hour test period, calculate the difference between the filter temperature indicated by the reference temperature sensor and the ambient temperature indicated by the test sampler as:

EQUATION 25

$$T_{diff} = T_{ref,filter} - T_{ind,ambient}$$

(ii) Tabulate and inspect the calculated differences as a function of time. To successfully pass the indicated filter temperature control test, the calculated difference between the measured values must not exceed 5 °C for any consecutive intervals covering more than a 30–minute time period.

(iii) For sequential samplers, repeat the test calculations for each of the stored sequential sample filters. All stored filters must also meet the 5 °C temperature control test.

[62 FR 38799, July 18, 1997; 63 FR 7714, Feb. 17, 1998, as amended at 71 FR 61292, Oct. 17, 2006]

### §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 five 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, and 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

$$C_{ave,j} = \frac{1}{3} \times \sum_{i=1}^{3} C_{1,j}$$

(ii) If $C_{ave,j} < 3$ μg/m³ 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.

[71 FR 61292, Oct. 17, 2006]

EFFECTIVE DATE NOTE: At 72 FR 32208, June 12, 2007, § 53.58 was amended by revising equation 26 of paragraph (g)(2)(i), effective Sept. 10, 2007. For the convenience of the user, the revised text is set forth as follows:

**§ 53.58 Operational field precision and blank test.**

* * * * *

(g) * * *
(2)(i) * * *

Equation 26

$$C_{ave,j} = \frac{1}{3} \times \sum_{i=1}^{3} C_{i,j}$$

* * * * *

**§ 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) *Technical definitions.* (1) Aerosol transport is the percentage of a laboratory challenge aerosol which penetrates to the active sample filter of the candidate equivalent method sampler.

(2) The active sample filter is the exclusive filter through which sample air is flowing during performance of this test.

(3) A no-flow filter is a sample filter through which no sample air is intended to flow during performance of this test.

(4) A channel is any of two or more flow paths that the aerosol may take, only one of which may be active at a time.

(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.

(c) *Required facilities and test equipment.* (1) Aerosol generation system, as specified in § 53.62(c)(2).

(2) Aerosol delivery system, as specified in § 53.64(c)(2).

(3) Particle size verification equipment, as specified in § 53.62(c)(3).

(4) Fluorometer, as specified in § 53.62(c)(7).

(5) Candidate test sampler, with the inlet and impactor or impactors removed, and with all internal surfaces of added components electroless nickel coated as specified in § 53.64(d)(2).

(6) Filters that are appropriate for use with fluorometric methods (e.g., glass fiber).

(d) *Calibration of test measurement instruments.* Submit documentation showing evidence of appropriately recent calibration, certification of calibration accuracy, and NIST-traceability (if required) of all measurement instruments used in the tests. The accuracy of flow rate meters shall be verified at the highest and lowest pressures and temperatures used in the tests and shall be checked at zero and at least one flow rate within ±3 percent of 16.7 L/min within 7 days prior to use for this test. Where an instrument's measurements are to be recorded with an analog recording device, the accuracy of the entire instrument-recorder system shall be calibrated or verified.

(e) *Test setup.* (1) The candidate test sampler shall have its inlet and impactor or impactors removed. The lower end of the down tube shall be reconnected to the filter holder, using an extension of the downtube, if necessary. If the candidate sampler has a separate impactor for each channel, then for this test, the filter holder assemblies must be connected to the physical location on the sampler where the impactors would normally connect.

(2) The test particle delivery system shall be connected to the sampler downtube so that the test aerosol is introduced at the top of the downtube.

(f) *Test procedure.* (1) All surfaces of the added or modified component or components which come in contact with the aerosol flow shall be thoroughly washed with 0.01 N NaOH and then dried.

(2) Generate aerosol. (i) Generate aerosol composed of oleic acid with a uranine fluorometric tag of 3 ±0.25 μm aerodynamic diameter using a vibrating orifice aerosol generator according to conventions specified in § 53.61(g).

(ii) Check for the presence of satellites and adjust the generator to minimize their production.

(iii) Calculate the aerodynamic particle size using the operating parameters of the vibrating orifice aerosol generator. The calculated aerodynamic diameter must be 3 ±0.25 μm aerodynamic diameter.

(3) Verify the particle size according to procedures specified in § 53.62(d)(4)(i).

(4) Collect particles on filters for a time period such that the relative error of the resulting measured fluorometric concentration for the active filter is less than 5 percent.

(5) Determine the quantity of material collected on the active filter using a calibrated fluorometer. Record the mass of fluorometric material for the active filter as $M_{active\ (i)}$ where i = the active channel number.

(6) Determine the quantity of material collected on each no-flow filter using a calibrated fluorometer. Record the mass of fluorometric material on each no-flow filter as $M_{no\text{-}flow}$.

(7) Using 0.01 N NaOH, wash the surfaces of the added component or components which contact the aerosol flow. Determine the quantity of material collected using a calibrated fluorometer. Record the mass of fluorometric material collected in the wash as $M_{wash}$.

(8) Calculate the aerosol transport as:

EQUATION 29

$$T_{(i)} = \frac{M_{active}}{M_{active+}M_{wash+}\sum M_{no\text{-}flow}} \times 100\%$$

where:

i = the active channel number.

(9) Repeat paragraphs (f)(1) through (8) of this section for each channel, making each channel in turn the exclusive active channel.

(g) *Test results*. The candidate Class I sampler passes the aerosol transport test if $T_{(i)}$ is at least 97 percent for each channel.

[62 FR 38799, July 18, 1997, as amended at 71 FR 61293, Oct. 17, 2006]

TABLE E–1 TO SUBPART E OF PART 53—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.<br>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 .....<br>1. Mean .....<br>2. Regulation .....<br>3. Meas accuracy .....<br>4. CV accuracy .....<br>5. Cut-off ..... | 1. 16.67 ? 5% L/min ....<br>2. 2%, max .....<br>3. 2%, max .....<br>4. 0.3%, max .....<br>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.<br>(b) Nominal conditions ..<br>(c) Additional 55 mm Hg pressure drop to simulate loaded filter.<br>(d) Variable flow restriction used for cut-off test. | Sec. 7.4.1,<br>Sec. 7.4.2<br>Sec. 7.4.3<br>Sec. 7.4.4<br>Sec. 7.4.5. |
| § 53.54 Power interruption test. | Sample flow rate: .....<br>1. Mean .....<br>2. Regulation .....<br>3. Meas. accuracy .....<br>4. CV accuracy .....<br>5. Occurrence time of power interruptions.<br>6. Elapsed sample time<br>7. Sample volume ..... | 1. 16.67 ?± 5% L/Min ..<br>2. 2%, max .....<br>3. 2%, max .....<br>4. 0.3% max .....<br>5. ?±2 min if >60 seconds.<br>6. ?±20 seconds .....<br>7. ±?2%, max ..... | (a) 6-hour normal operational test.<br>(b) Nominal conditions<br>(c) Additional 55 mm Hg pressure drop to simulate loaded filter.<br>(d) 6 power interruptions of various durations. | Sec. 7.4.1,<br>Sec. 7.4.2<br>Sec. 7.4.3<br>Sec. 7.4.5<br>Sec. 7.4.12<br>Sec. 7.4.13<br>Sec. 7.4.15.4<br>Sec. 7.4.15.5. |

| Subpart E procedure | Performance test | Performance specification | Test conditions | Part 50, appendix L reference |
|---|---|---|---|---|
| § 53.55 Temperature and line voltage test. | Sample flow rate .....<br>1. Mean .....<br>2. Regulation .....<br>3. Meas. accuracy .....<br>4. CV accuracy .....<br>5. Temperature meas. accuracy.<br>6. Proper operation ..... | 1. 16.6 ±? 5% L/min ....<br>2. 2%, max .....<br>3. 2%, max .....<br>4. 0.3% max .....<br>5. 2 °C ..... | (a) 6-hour normal operational test.<br>(b) Normal conditions ..<br>(c) Additional 55 mm Hg pressure drop to simulate loaded filter.<br>(d) Ambient temperature at −20 and +40 °C.<br>(e) Line voltage: 105 Vac to 125 Vac. | Sec. 7.4.1,<br>Sec. 7.4.2<br>Sec. 7.4.3<br>Sec. 7.4.5<br>Sec. 7.4.8<br>Sec. 7.4.15.1. |
| § 53.56 Barometric pressure effect test. | Sample flow rate .....<br>1. Mean .....<br>2. Regulation .....<br>3. Meas. accuracy .....<br>4. CV accuracy .....<br>5. Pressure meas. accuracy.<br>6. Proper operation ..... | 1. 16.67 ?± ? 5% L/min<br>2. 2%, max .....<br>3. 2%, max .....<br>3. 2%, max .....<br>4. 0.3%, max .....<br>5. 10 mm Hg ..... | (a) 6-hour normal operational test.<br>(b) Normal conditions ..<br>(c) Additional 55 mm Hg pressure drop to simulate loaded filter.<br>(d) Barometric pressure at 600 and 800 mm Hg. | Sec. 7.4.1,<br>Sec. 7.4.2<br>Sec. 7.4.3<br>Sec. 7.4.5<br>Sec. 7.4.9. |
| § 53.57 Filter temperature control test. | 1. Filter temp meas. accuracy.<br>2. Ambient temp. meas. accuracy.<br>3. Filter temp. control accuracy, sampling and non-sampling. | 1. 2 °C .....<br>2. 2 °C .....<br>3. Not more than 5 °C above ambient temp. for more than 30 min.. | (a) 4-hour simulated solar radiation, sampling.<br>(b) 4-hour simulated solar radiation, non-sampling.<br>(c) Solar flux of 1000 ?50 W/m². | Sec. 7.4.8<br>Sec. 7.4.10<br>Sec. 7.4.11. |
| § 53.58 Field precision test. | 1. Measurement precision.<br>2. Storage deposition test for sequential samplers. | 1. $P_j$ < 2 μg/m³ or $RP_j$ < 5%.<br>2. 50 μg max. average weight gain/blank filter. | (a) 3 collocated samplers at 1 site for at least 10 days;.<br>(b) $PM_{2.5}$ conc. > 3 μg/m³.<br>(c) 24- or 48-hour samples.<br>(d) 5- or 10-day storage period for inactive stored filters. | Sec. 5.1<br>Sec. 7.3.5<br>Sec. 8<br>Sec. 9<br>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. | |

[71 FR 61294, Oct. 17, 2006]

EFFECTIVE DATE NOTE: At 72 FR 32208, June 12, 2007, Table E–1 to subpart E of part 53 was revised, effective Sept. 10, 2007. For the convenience of the user, the revised text is set forth as follows:

TABLE E–1 TO SUBPART E OF PART 53.—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.<br>Internal leakage: 80 mL/min, max. | Controlled leak flow rate of 80 mL/min. | Sec. 7.4.6. |

| Subpart E procedure | Performance test | Performance specification | Test conditions | Part 50, appendix L reference |
|---|---|---|---|---|
| § 53.53 Base flow rate test. | Sample flow rate .....<br>1. Mean .....<br>2. Regulation .....<br>3. Meas accuracy .....<br>4. CV accuracy .....<br>5. Cut-off ..... | 1. 16.67 ± 5%, L/min ...<br>2. 2%, max .....<br>3. 2%, max .....<br>4. 0.3% max .....<br>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.<br>(b) Normal conditions ..<br>(c) Additional 55 mm Hg pressure drop to simulate loaded filter.<br>(d) Variable flow restriction used for cut-off test. | Sec. 7.4.1.<br>Sec. 7.4.2.<br>Sec. 7.4.3.<br>Sec. 7.4.4.<br>Sec. 7.4.5. |
| § 53.54 Power interruption test. | Sample flow rate .....<br>1. Mean .....<br>2. Regulation .....<br>3. Meas. accuracy .....<br>4. CV accuracy .....<br>5. Occurrence time of power interruptions.<br>6. Elapsed sample time<br>7. Sample volume ..... | 1. 16.67 ± 5%, L/min ...<br>2. 2%, max .....<br>3. 2%, max .....<br>4. 0.3% max .....<br>5. ± 2 min if >60 seconds..<br>6. ± 20 seconds .....<br>7. ± 2%, max ..... | (a) 6-hour normal operational test.<br>(b) Nominal conditions<br>(c) Additional 55 mm Hg pressure drop to simulate loaded filter.<br>(d) 6 power interruptions of various durations. | Sec. 7.4.1.<br>Sec. 7.4.2.<br>Sec. 7.4.3.<br>Sec. 7.4.5.<br>Sec. 7.4.12.<br>Sec. 7.4.13.<br>Sec. 7.4.15.4.<br>Sec. 7.4.15.5. |
| § 53.55 Temperature and line voltage test. | Sample flow rate .....<br>1. Mean .....<br>2. Regulation .....<br>3. Meas. accuracy .....<br>4. CV accuracy .....<br>5. Temperature meas. accuracy.<br>6. Proper operation. | 1. 16.67 ± 5%, L/min ...<br>2. 2%, max .....<br>3. 2%, max .....<br>4. 0.3% max .....<br>5. 2 °C ..... | (a) 6-hour normal operational test.<br>(b) Normal conditions ..<br>(c) Additional 55 mm Hg pressure drop to simulate loaded filter.<br>(d) Ambient temperature at −20 and +40 °C.<br>(e) Line voltage: 105 Vac to 125 Vac. | Sec. 7.4.1.<br>Sec. 7.4.2.<br>Sec. 7.4.3.<br>Sec. 7.4.5.<br>Sec. 7.4.8.<br>Sec. 7.4.15.1. |
| § 53.56 Barometric pressure effect test. | Sample flow rate .....<br>1. Mean .....<br>2. Regulation .....<br>3. Meas. accuracy .....<br>4. CV accuracy .....<br>5. Pressure meas. accuracy.<br>6. Proper operation. | 1. 16.67 ± 5%, L/min ...<br>2. 2%, max .....<br>3. 2%, max .....<br>4. 0.3% max .....<br>5. 10 mm Hg ..... | (a) 6-hour normal operational test.<br>(b) Normal conditions ..<br>(c) Additional 55 mm Hg pressure drop to simulate loaded filter.<br>(d) Barometric pressure at 600 and 800 mm Hg. | Sec. 7.4.1.<br>Sec. 7.4.2.<br>Sec. 7.4.3.<br>Sec. 7.4.5.<br>Sec. 7.4.9. |
| § 53.57 Filter temperature control test. | 1. Filter temp. meas. accuracy.<br>2. Ambient temp. meas. accuracy.<br>3. Filter temp. control accuracy, sampling and non-sampling. | 1. 2 °C .....<br>2. 2 °C .....<br>3. Not more than 5 °C above ambient temp. for more than 30 min. | (a) 4-hour simulated solar radiation, sampling.<br>(b) 4-hour simulated solar radiation, non-sampling.<br>(c) Solar flux of 1000 ± 50 W/m². | Sec. 7.4.8.<br>Sec. 7.4.10.<br>Sec. 7.4.11. |
| § 53.58 Field precision test. | 1. Measurement precision.<br>2. Storage deposition test for sequential samplers. | 1. $P_j$ < 2 μg/m³ or $RP_j$ < 5%.<br>2. 50 μg max. average weight gain/blank filter. | (a) 3 collocated samplers at 1 site for at least 10 days.<br>(b) $PM_{2.5}$ conc. > 3 μg/m³.<br>(c) 24- or 48-hour samples.<br>(d) 5- or 10-day storage period for inactive stored filters. | Sec. 5.1.<br>Sec. 7.3.5.<br>Sec. 8.<br>Sec. 9.<br>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. | |

TABLE E–2 TO SUBPART E OF PART 53—SPECTRAL ENERGY DISTRIBUTION AND PERMITTED TOLERANCE FOR CONDUCTING RADIATIVE TESTS

| Characteristic | Spectral Region | | | |
|---|---|---|---|---|
| | Ultraviolet | | Visible | Infrared |
| Bandwidth (μm) | 0.28 to 0.32 | 0.32 to 0.40 | 0.40 to 0.78 | 0.78 to 3.00 |
| Irradiance (W/m²) | 5 | 56 | 450 to 550 | 439 |
| Allowed Tolerance | ±35% | ±25% | ±10% | ±10% |

[62 FR 38799, July 18, 1997; 63 FR 7714, Feb. 17, 1998]

FIGURE E–1 TO SUBPART E OF PART 53—DESIGNATION TESTING CHECKLIST

**DESIGNATION TESTING CHECKLIST**

Auditee _____ Auditor signature _____ Date _____

| Compliance Status: Y = Yes N = No NA = Not applicable/Not available | | | | Verification Comments (Includes documentation of who, what, where, when, why) (Doc. #, Rev. #, Rev. Date) |
|---|---|---|---|---|
| Verification | | | Verified by Direct Observation of Process or of Documented Evidence: Performance, Design or Application Spec. Corresponding to Sections of 40 CFR Part 53 or 40 CFR Part 50, Appendix L | |
| Y | N | NA | | |
| | | | **Performance Specification Tests**<br>Sample flow rate coefficient of variation (§ 53.53) (L–7.4.3) | |
| | | | Filter temperature control (sampling) (§ 53.57) (L–7.4.10) | |
| | | | Elapsed sample time accuracy (§ 53.54) (L–7.4.13) | |
| | | | Filter temperature control (post sampling) (§ 53.57) (L–7.4.10) | |
| | | | **Application Specification Tests** | |
| | | | Field Precision (§ 53.58) (L–5.1) | |
| | | | Meets all Appendix L requirements (part 53, subpart A, § 53.2(a)(3)) (part 53, subpart E, § 53.51(a),(d)) | |
| | | | Filter Weighing (L–8) | |
| | | | Field Sampling Procedure (§ 53.30, .31, .34) | |
| | | | **Design Specification Tests** | |
| | | | Filter ( L–6) | |
| | | | Range of Operational Conditions (L–7.4.7) | |
| The Following Requirements Apply Only to Class I Candidate Equivalent Methods | | | | |
| | | | Aerosol Transport (§ 53.59) | |

FIGURE E–2 TO SUBPART E OF PART 53—PRODUCT MANUFACTURING CHECKLIST

**PRODUCT MANUFACTURING CHECKLIST**

Auditee _____ Auditor signature _____ Date _____

| Compliance Status: Y = Yes N = No NA = Not applicable/Not available | | | | Verification Comments (Includes documentation of who, what, where, when, why) (Doc. #, Rev. #, Rev. Date) |
|---|---|---|---|---|
| Verification | | | Verified by Direct Observation of Process or of Documented Evidence: Performance, Design or Application Spec. Corresponding to Sections of 40 CFR Part 53 or 40 CFR Part 50, Appendix L | |
| Y | N | NA | | |
| | | | **Performance Specification Tests** | |
| | | | Assembled operational performance (Burn-in test) (§ 53.53) | |

| Compliance Status: Y = Yes N = No NA = Not applicable/Not available | | | | Verification Comments (Includes documentation of who, what, where, when, why) (Doc. #, Rev. #, Rev. Date) |
|---|---|---|---|---|
| Verification | | | Verified by Direct Observation of Process or of Documented Evidence: Performance, Design or Application Spec. Corresponding to Sections of 40 CFR Part 53 or 40 CFR Part 50, Appendix L | |
| Y | N | NA | | |
| | | | Sample flow rate (§ 53.53) (L–7.4.1, L–7.4.2) | |
| | | | Sample flow rate regulation (§ 53.53) (L–7.4.3) | |
| | | | Flow rate and average flow rate measurement accuracy (§ 53.53) (L–7.4.5) | |
| | | | Ambient air temperature measurement accuracy (§ 53.55) (L–7.4.8) | |
| | | | Ambient barometric pressure measurement accuracy (§ 53.56) (L–7.4.9) | |
| | | | Sample flow rate cut-off (§ 53.53) (L–7.4.4) | |
| | | | Sampler leak check facility (§ 53.52) (L–7.4.6) | |
| | | | **Application Specification Tests** | |
| | | | Flow rate calibration transfer standard (L-9.2) | |
| | | | Operational /Instructional manual (L-7.4.18) | |
| | | | **Design Specification Tests** | |
| | | | Impactor (jet width) (§ 53.51(d)(1)) (L-7.3.4.1) | |
| | | | Surface finish (§ 53.51( d)(2)) (L-7.3.7) | |

## APPENDIX A TO SUBPART E OF PART 53—REFERENCES

(1) American National Standard Quality Systems—Model for Quality Assurance in Design, Development, Production, Installation, and Servicing, ANSI/ISO/ASQC Q9001–1994. Available from American Society for Quality, P.O. Box 3005, Milwaukee, WI 53202 (*http://qualitypress.asq.org*).

(2) American National Standard Quality Systems for Environmental Data and Technology Programs—Requirements with guidance for use, ANSI/ASQC E4–2004. Available from American Society for Quality, P.O. Box 3005, Milwaukee, WI 53202 (*http://qualitypress.asq.org*).

(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/pmqainf.html*.

(4) Military standard specification (mil. spec.) 8625F, Type II, Class 1 as listed in Department of Defense Index of Specifications and Standards (DODISS), available from DODSSP-Customer Service, Standardization Documents Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 1911-5094.

(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.

(6) Military standard specification (mil. spec.) 810-E as listed in Department of Defense Index of Specifications and Standards (DODISS), available from DODSSP-Customer Service, Standardization Documents Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 1911-5094.

[62 FR 38799, July 18, 1997, as amended at 71 FR 61295, Oct. 17, 2006]

# Subpart F—Procedures for Testing Performance Characteristics of Class II Equivalent Methods for $PM_{2.5}$

SOURCE: 62 FR 38814, July 18, 1997, unless otherwise noted.

### § 53.60 General provisions.

(a) This subpart sets forth the specific requirements that a $PM_{2.5}$ sampler associated with a candidate Class II equivalent method must meet to be designated as an equivalent method for $PM_{2.5}$. This subpart also sets forth the explicit test procedures that must be

carried out and the test results, evidence, documentation, and other materials that must be provided to EPA to demonstrate that a sampler meets all specified requirements for designation as an equivalent method.

(b) A candidate method described in an application for a FRM or FEM 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 FEM in §53.1.

(c) Any sampler associated with a Class II candidate equivalent method (Class II sampler) must meet all applicable requirements for FRM samplers or Class I FEM 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.

(1) *Inlet deviation*. A sampler which has been determined to be a Class II sampler solely because the design or construction of its inlet deviates from the design or construction of the inlet specified in 40 CFR part 50, appendix L, for reference method samplers shall not be subject to the requirements of §53.62 (full wind tunnel test), provided that it meets all requirements of §53.63 (wind tunnel inlet aspiration test), §53.65 (loading test), and §53.66 (volatility test).

(2) *Fractionator deviation*. A sampler which has been determined to be a Class II sampler solely because the design or construction of its particle size fractionator deviates from the design or construction of the particle size fractionator specified in 40 CFR part 50, appendix L for reference method samplers shall not be subject to the requirements of §53.62 (full wind tunnel test), provided that it meets all requirements of §53.64 (static fractionator test), §53.65 (loading test), and §53.66 (volatility test).

(3) *Filter size deviation*. A sampler which has been determined to be a Class II sampler solely because its effective filtration area deviates from that of the reference method filter specified in 40 CFR part 50, appendix L, for reference method samplers shall not be subject to the requirements of §53.62 (full wind tunnel test) nor §53.65 (loading test), provided it meets all requirements of §53.66 (volatility test).

(e) *The test specifications and acceptance criteria for each test are summarized in table F–1 of this subpart*. The candidate sampler must demonstrate performance that meets the acceptance criteria for each applicable test to be designated as an equivalent method.

(f) *Overview of various test procedures for Class II samplers*—(1) *Full wind tunnel test*. This test procedure is designed to ensure that the candidate sampler's effectiveness (aspiration of an ambient aerosol and penetration of the sub 2.5-micron fraction to its sample filter) will be comparable to that of a reference method sampler. The candidate sampler is challenged at wind speeds of 2 and 24 km/hr with monodisperse aerosols of the size specified in table F–2 of this subpart. The experimental test results are then integrated with three idealized ambient distributions (typical, fine, and coarse) to yield the expected mass concentration measurement for each. The acceptance criteria are based on the results of this numerical analysis and the particle diameter for which the sampler effectiveness is 50 percent.

(2) *Wind tunnel inlet aspiration test*. The wind tunnel inlet aspiration test directly compares the inlet of the candidate sampler to the inlet of a reference method sampler with the single-sized, liquid, monodisperse challenge aerosol specified in table F–2 of this subpart at wind speeds of 2 km/hr and 24 km/hr. The acceptance criteria, presented in table F–1 of this subpart, is

based on the relative aspiration between the candidate inlet and the reference method inlet.

(3) *Static fractionator test.* The static fractionator test determines the effectiveness of the candidate sampler's 2.5-micron fractionator under static conditions for aerosols of the size specified in table F–2 of this subpart. The numerical analysis procedures and acceptance criteria are identical to those in the full wind tunnel test.

(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.

(5) *Volatility test.* The volatility test challenges the candidate sampler with a polydisperse, semi-volatile liquid aerosol. This aerosol is simultaneously sampled by the candidate method sampler and a reference method sampler for a specified time period. Clean air is then passed through the samplers during a blow-off time period. Residual mass is then calculated as the weight of the filter after the blow-off phase is subtracted from the initial weight of the filter. Acceptance criteria are based on a comparison of the residual mass measured by the candidate sampler (corrected for flow rate variations from that of the reference method) to the residual mass measured by the reference method sampler for several specified clean air sampling time periods.

(g) *Test data.* All test data and other documentation obtained from or pertinent to these tests shall be identified, dated, signed by the analyst performing the test, and submitted to EPA as part of the equivalent method application. Schematic drawings of each particle delivery system and other information showing complete procedural details of the test atmosphere generation, verification, and delivery techniques for each test performed shall be submitted to EPA. All pertinent calculations shall be clearly presented. In addition, manufacturers are required to submit as part of the application, a Designation Testing Checklist (Figure F–1 of this subpart) which has been completed and signed by an ISO-certified auditor.

[62 FR 38814, July 18, 1997, as amended at 71 FR 61295, Oct. 17, 2006]

### § 53.61 Test conditions.

(a) *Sampler surface preparation.* Internal surfaces of the candidate sampler shall be cleaned and dried prior to performing any Class II sampler test in this subpart. The internal collection surfaces of the sampler shall then be prepared in strict accordance with the operating instructions specified in the sampler's operating manual referred to in section 7.4.18 of 40 CFR part 50, appendix L.

(b) *Sampler setup.* Set up and start up of all test samplers shall be in strict accordance with the operating instructions specified in the manual referred to in section 7.4.18 of 40 CFR part 50, appendix L, unless otherwise specified within this subpart.

(c) *Sampler adjustments.* Once the test sampler or samplers have been set up and the performance tests started, manual adjustment shall be permitted only between test points for all applicable tests. Manual adjustments and any periodic maintenance shall be limited to only those procedures prescribed in the manual referred to in section 7.4.18 of 40 CFR part 50, appendix L. The submitted records shall clearly indicate when any manual adjustment or periodic maintenance was made and shall describe the operations performed.

(d) *Sampler malfunctions.* If a test sampler malfunctions during any of the applicable tests, that test run shall be repeated. A detailed explanation of all malfunctions and the remedial actions taken shall be submitted as part of the equivalent method application.

(e) *Particle concentration measurements.* All measurements of particle concentration must be made such that the relative error in measurement is less than 5.0 percent. Relative error is defined as (s × 100 percent)/(X), where s is the sample standard deviation of the particle concentration detector, X is the measured concentration, and the units of s and X are identical.

(f) *Operation of test measurement equipment.* All test measurement equipment shall be set up, calibrated, and maintained by qualified personnel according to the manufacturer's instructions. All appropriate calibration information and manuals for this equipment shall be kept on file.

(g) *Vibrating orifice aerosol generator conventions.* This section prescribes conventions regarding the use of the vibrating orifice aerosol generator (VOAG) for the size-selective performance tests outlined in §§53.62, 53.63, 53.64, and 53.65.

(1) *Particle aerodynamic diameter.* The VOAG produces near-monodisperse droplets through the controlled breakup of a liquid jet. When the liquid solution consists of a non-volatile solute dissolved in a volatile solvent, the droplets dry to form particles of near-monodisperse size.

(i) The physical diameter of a generated spherical particle can be calculated from the operating parameters of the VOAG as:

EQUATION 1

$$D_p = \left( \frac{6\ Q\ C_{vol}}{\pi\ f} \right)^{1/3}$$

where:

$D_p$ = particle physical diameter, μm;
Q = liquid volumetric flow rate, μm³/sec;
$C_{vol}$ = volume concentration (particle volume produced per drop volume), dimensionless; and
f = frequency of applied vibrational signal, 1/sec.

(ii) A given particle's aerodynamic behavior is a function of its physical particle size, particle shape, and density. Aerodynamic diameter is defined as the diameter of a unit density ($\rho_o$ = 1g/cm³) sphere having the same settling velocity as the particle under consideration. For converting a spherical particle of known density to aerodynamic diameter, the governing relationship is:

EQUATION 2

$$D_{ae} = \frac{\sqrt{\rho_p}\sqrt{C_{D_p}}\,D_p}{\sqrt{\rho_o}\sqrt{C_{D_{ae}}}}$$

where:

$D_{ae}$ = particle aerodynamic diameter, μm;
$\rho_p$ = particle density, g/cm³;
$\rho_o$ = aerodynamic particle density = 1 g/cm³;
$C_{Dp}$ = Cunningham's slip correction factor for physical particle diameter, dimensionless; and
$C_{Dae}$ = Cunningham's slip correction factor for aerodynamic particle diameter, dimensionless.

(iii) At room temperature and standard pressure, the Cunningham's slip correction factor is solely a function of particle diameter:

EQUATION 3

$$C_{Dae} = 1 + \frac{0.1659}{D_{ae}} + \frac{0.053}{D_{ae}}\ \exp\left(-8.33\ D_{ae}\right)$$

or

EQUATION 4

$$C_{D_p} = 1 + \frac{0.1659}{D_p} + \frac{0.053}{D_p}\ \exp\left(-8.33\ D_p\right)$$

(iv) Since the slip correction factor is itself a function of particle diameter, the aerodynamic diameter in equation 2 of paragraph (g)(1)(ii) of this section cannot be solved directly but must be determined by iteration.

(2) *Solid particle generation.* (i) Solid particle tests performed in this subpart shall be conducted using particles composed of ammonium fluorescein. For use in the VOAG, liquid solutions of known volumetric concentration can be prepared by diluting fluorescein

powder ($C_20H_{12}O_5$, FW = 332.31, CAS 2321-07-5) with aqueous ammonia. Guidelines for preparation of fluorescein solutions of the desired volume concentration ($C_{vol}$) are presented by Vanderpool and Rubow (1988) (Reference 2 in appendix A of this subpart). For purposes of converting particle physical diameter to aerodynamic diameter, an ammonium fluorescein density of 1.35 g/cm$^3$ shall be used.

(ii) Mass deposits of ammonium fluorescein shall be extracted and analyzed using solutions of 0.01 N ammonium hydroxide.

(3) *Liquid particle generation.* (i) Tests prescribed in § 53.63 for inlet aspiration require the use of liquid particle tests composed of oleic acid tagged with uranine to enable subsequent fluorometric quantitation of collected aerosol mass deposits. Oleic acid ($C_{18}H_{34}O_2$, FW = 282.47, CAS 112-80-1) has a density of 0.8935 g/cm$^3$. Because the viscosity of oleic acid is relatively high, significant errors can occur when dispensing oleic acid using volumetric pipettes. For this reason, it is recommended that oleic acid solutions be prepared by quantifying dispensed oleic acid gravimetrically. The volume of oleic acid dispensed can then be calculated simply by dividing the dispensed mass by the oleic acid density.

(ii) Oleic acid solutions tagged with uranine shall be prepared as follows. A known mass of oleic acid shall first be diluted using absolute ethanol. The desired mass of the uranine tag should then be diluted in a separate container using absolute ethanol. Uranine ($C_{20}H_{10}O_5Na_2$, FW = 376.3, CAS 518-47-8) is the disodium salt of fluorescein and has a density of 1.53 g/cm$^3$. In preparing uranine tagged oleic acid particles, the uranine content shall not exceed 20 percent on a mass basis. Once both oleic acid and uranine solutions are properly prepared, they can then be combined and diluted to final volume using absolute ethanol.

(iii) Calculation of the physical diameter of the particles produced by the VOAG requires knowledge of the liquid solution's volume concentration ($C_{vol}$). Because uranine is essentially insoluble in oleic acid, the total particle volume is the sum of the oleic acid volume and the uranine volume. The volume concentration of the liquid solution shall be calculated as:

EQUATION 5

$$C_{vol} = \frac{V_u + V_{oleic}}{V_{sol}} = \frac{\left(M_u/\rho_u\right) + \left(M_{oleic}/\rho_{oleic}\right)}{V_{sol}}$$

where:

$V_u$ = uranine volume, ml;
$V_{oleic}$ = oleic acid volume, ml;
$V_{sol}$ = total solution volume, ml;
$M_u$ = uranine mass, g;
$\rho_u$ = uranine density, g/cm$^3$;
$M_{oleic}$ = oleic acid mass, g; and
$\rho_{oleic}$ = oleic acid density, g/cm$^3$.

(iv) For purposes of converting the particles' physical diameter to aerodynamic diameter, the density of the generated particles shall be calculated as:

EQUATION 6

$$\rho_p = \frac{M_u + M_{oleic}}{\left(M_u/\rho_u\right) + \left(M_{oleic}/\rho_{oleic}\right)}$$

(v) Mass deposits of oleic acid shall be extracted and analyzed using solutions of 0.01 N sodium hydroxide.

[62 FR 38814, July 18, 1997; 63 FR 7714, Feb. 17, 1998]

### § 53.62 Test procedure: Full wind tunnel test.

(a) *Overview.* The full wind tunnel test evaluates the effectiveness of the candidate sampler at 2 km/hr and 24 km/hr for aerosols of the size specified in table F–2 of this subpart (under the heading, ''Full Wind Tunnel Test''). For each wind speed, a smooth curve is fit to the effectiveness data and corrected for the presence of multiplets in the wind tunnel calibration aerosol. The cutpoint diameter ($D_{p50}$) at each wind speed is then determined from the corrected effectiveness curves. The two resultant penetration curves are then each numerically integrated with three idealized ambient particle size distributions to provide six estimates of measured mass concentration. Critical parameters for these idealized distributions are presented in table F–3 of this subpart.

(b) *Technical definitions.* Effectiveness is the ratio (expressed as a percentage) of the mass concentration of particles of a specific size reaching the sampler filter or filters to the mass concentration of particles of the same size approaching the sampler.

(c) *Facilities and equipment required*—(1) *Wind tunnel.* The particle delivery system shall consist of a blower system and a wind tunnel having a test section of sufficiently large cross-sectional area such that the test sampler, or portion thereof, as installed in the test section for testing, blocks no more than 15 percent of the test section area. The wind tunnel blower system must be capable of maintaining uniform wind speeds at the 2 km/hr and 24 km/hr in the test section.

(2) *Aerosol generation system.* A vibrating orifice aerosol generator shall be used to produce monodisperse solid particles of ammonium fluorescein with equivalent aerodynamic diameters as specified in table F–2 of this subpart. The geometric standard deviation for each particle size generated shall not exceed 1.1 (for primary particles) and the proportion of multiplets (doublets and triplets) in all test particle atmosphere shall not exceed 10 percent of the particle population. The aerodynamic particle diameter, as established by the operating parameters of the vibrating orifice aerosol generator, shall be within the tolerance specified in table F–2 of this subpart.

(3) *Particle size verification equipment.* The size of the test particles shall be verified during this test by use of a suitable instrument (e.g., scanning electron microscope, optical particle sizer, time-of-flight apparatus). The instrument must be capable of measuring solid and liquid test particles with a size resolution of 0.1 μm or less. The accuracy of the particle size verification technique shall be 0.15 μm or better.

(4) *Wind speed measurement.* The wind speed in the wind tunnel shall be determined during the tests using an appropriate technique capable of a precision of 2 percent and an accuracy of 5 percent or better (e.g., hot-wire anemometry). For the wind speeds specified in table F–2 of this subpart, the wind speed shall be measured at a minimum of 12 test points in a cross-sectional area of the test section of the wind tunnel. The mean wind speed in the test section must be within ±10 percent of the value specified in table F–2 of this subpart, and the variation at any test point in the test section may not exceed 10 percent of the measured mean.

(5) *Aerosol rake.* The cross-sectional uniformity of the particle concentration in the sampling zone of the test section shall be established during the tests using an array of isokinetic samplers, referred to as a rake. Not less than five evenly spaced isokinetic samplers shall be used to determine the particle concentration spatial uniformity in the sampling zone. The sampling zone shall be a rectangular area having a horizontal dimension not less than 1.2 times the width of the test sampler at its inlet opening and a vertical dimension not less than 25 centimeters.

(6) *Total aerosol isokinetic sampler.* After cross-sectional uniformity has been confirmed, a single isokinetic sampler may be used in place of the array of isokinetic samplers for the determination of particle mass concentration used in the calculation of sampling effectiveness of the test sampler in paragraph (d)(5) of this section. In this case, the array of isokinetic samplers must be used to demonstrate particle concentration uniformity prior to the replicate measurements of sampling effectiveness.

(7) *Fluorometer.* A fluorometer used for quantifying extracted aerosol mass deposits shall be set up, maintained, and calibrated according to the manufacturer's instructions. A series of calibration standards shall be prepared to encompass the minimum and maximum concentrations measured during size-selective tests. Prior to each calibration and measurement, the fluorometer shall be zeroed using an aliquot of the same solvent used for extracting aerosol mass deposits.

(8) *Sampler flow rate measurements.* All flow rate measurements used to calculate the test atmosphere concentrations and the test results must be accurate to within ±2 percent, referenced to a NIST-traceable primary standard. Any necessary flow rate measurement

corrections shall be clearly documented. All flow rate measurements shall be performed and reported in actual volumetric units.

(d) *Test procedures*—(1) *Establish and verify wind speed.* (i) Establish a wind speed specified in table F–2 of this subpart.

(ii) Measure the wind speed at a minimum of 12 test points in a cross-sectional area of the test section of the wind tunnel using a device as described in paragraph (c)(4) of this section.

(iii) Verify that the mean wind speed in the test section of the wind tunnel during the tests is within 10 percent of the value specified in table F–2 of this subpart. The wind speed measured at any test point in the test section shall not differ by more than 10 percent from the mean wind speed in the test section.

(2) *Generate aerosol.* (i) Generate particles of a size specified in table F–2 of this subpart using a vibrating orifice aerosol generator.

(ii) Check for the presence of satellites and adjust the generator as necessary.

(iii) Calculate the physical particle size using the operating parameters of the vibrating orifice aerosol generator and record.

(iv) Determine the particle's aerodynamic diameter from the calculated physical diameter and the known density of the generated particle. The calculated aerodynamic diameter must be within the tolerance specified in table F–2 of this subpart.

(3) *Introduce particles into the wind tunnel.* Introduce the generated particles into the wind tunnel and allow the particle concentration to stabilize.

(4) *Verify the quality of the test aerosol.* (i) Extract a representative sample of the aerosol from the sampling test zone and measure the size distribution of the collected particles using an appropriate sizing technique. If the measurement technique does not provide a direct measure of aerodynamic diameter, the geometric mean aerodynamic diameter of the challenge aerosol must be calculated using the known density of the particle and the measured mean physical diameter. The determined geometric mean aerodynamic diameter of the test aerosol must be within 0.15 μm of the aerodynamic diameter calculated from the operating parameters of the vibrating orifice aerosol generator. The geometric standard deviation of the primary particles must not exceed 1.1.

(ii) Determine the population of multiplets in the collected sample. The multiplet population of the particle test atmosphere must not exceed 10 percent of the total particle population.

(5) *Aerosol uniformity and concentration measurement.* (i) Install an array of five or more evenly spaced isokinetic samplers in the sampling zone (paragraph (c)(5) of this section). Collect particles on appropriate filters over a time period such that the relative error of the measured particle concentration is less than 5.0 percent.

(ii) Determine the quantity of material collected with each isokinetic sampler in the array using a calibrated fluorometer. Calculate and record the mass concentration for each isokinetic sampler as:

EQUATION 7

$$C_{iso(ij)} = \frac{M_{iso(ij)}}{Q_{(ij)} \times t_{(ij)}}$$

where:

i = replicate number;
j = isokinetic sampler number;
$M_{iso}$ = mass of material collected with the isokinetic sampler;
Q = isokinetic sampler volumetric flow rate; and
t = sampling time.

(iii) Calculate and record the mean mass concentration as:

EQUATION 8

$$\overline{C}_{iso(i)} = \frac{\sum_{j=1}^{n} C_{iso(ij)}}{n}$$

where:

i = replicate number;
j = isokinetic sampler number; and
n = total number of isokinetic samplers.

(iv) Precision calculation. (A) Calculate the coefficient of variation of

the mass concentration measurements as:

EQUATION 9

$$CV_{iso(i)} = \frac{\sqrt{\sum_{j=1}^{n} C_{iso(ij)}^2 - \frac{1}{n}\left(\sum_{j=1}^{n} C_{iso(ij)}\right)^2}}{n-1} / \overline{C}_{iso(i)} \times 100\%$$

where:

i = replicate number;
j = isokinetic sampler number; and
n = total number of isokinetic samplers.

(B) If the value of $CV_{iso(i)}$ for any replicate exceeds 10 percent, the particle concentration uniformity is unacceptable and step 5 must be repeated. If adjustment of the vibrating orifice aerosol generator or changes in the particle delivery system are necessary to achieve uniformity, steps 1 through 5 must be repeated. When an acceptable aerosol spatial uniformity is achieved, remove the array of isokinetic samplers from the wind tunnel.

(6) *Alternative measure of wind tunnel total concentration.* If a single isokinetic sampler is used to determine the mean aerosol concentration in the wind tunnel, install the sampler in the wind tunnel with the sampler nozzle centered in the sampling zone (paragraph (c)(6) of this section).

(i) Collect particles on an appropriate filter over a time period such that the relative error of the measured concentration is less than 5.0 percent.

(ii) Determine the quantity of material collected with the isokinetic sampler using a calibrated fluorometer.

(iii) Calculate and record the mass concentration as $C_{iso(i)}$ as in paragraph (d)(5)(ii) of this section.

(iv) Remove the isokinetic sampler from the wind tunnel.

(7) *Measure the aerosol with the candidate sampler.* (i) Install the test sampler (or portion thereof) in the wind tunnel with the sampler inlet opening centered in the sampling zone. To meet the maximum blockage limit of paragraph (c)(1) of this section or for convenience, part of the test sampler may be positioned external to the wind tunnel provided that neither the geometry of the sampler nor the length of any connecting tube or pipe is altered. Collect particles for a time period such that the relative error of the measured concentration is less than 5.0 percent.

(ii) Remove the test sampler from the wind tunnel.

(iii) Determine the quantity of material collected with the test sampler using a calibrated fluorometer. Calculate and record the mass concentration for each replicate as:

EQUATION 10

$$C_{cand(i)} = \frac{M_{cand(i)}}{Q_{(i)} \times t_{(i)}}$$

where:

i = replicate number;
$M_{cand}$ = mass of material collected with the candidate sampler;
Q = candidate sampler volumetric flow rate; and
t = sampling time.

(iv)(A) Calculate and record the sampling effectiveness of the candidate sampler as:

EQUATION 11

$$E_{(i)} = \frac{C_{cand(i)}}{\overline{C}_{iso(i)}} \times 100\%$$

where:

i = replicate number.

(B) If a single isokinetic sampler is used for the determination of particle mass concentration, replace $C_{iso(i)}$ with $C_{iso}$.

(8) *Replicate measurements and calculation of mean sampling effectiveness.* (i) Repeat steps in paragraphs (d)(5) through (d)(7) of this section, as appropriate, to obtain a minimum of three valid replicate measurements of sampling effectiveness.

(ii) Calculate and record the average sampling effectiveness of the test sampler for the particle size as:

EQUATION 12

$$\overline{E} = \frac{\sum_{i=1}^{n} E_{(i)}}{n}$$

where:

i = replicate number; and

n = number of replicates.

(iii) Sampling effectiveness precision. (A) Calculate and record the coefficient of variation for the replicate sampling effectiveness measurements of the test sampler as:

EQUATION 13

$$CV_E = \frac{\sqrt{\sum_{i=1}^{n} E_{(i)}^2 - \frac{1}{n}\left(\sum_{i=1}^{n} E_{(i)}\right)^2}}{n-1} \frac{1}{\overline{E}} \times 100\%$$

where:

i = replicate number, and
n = number of replicates.

(B) If the value of $CV_E$ exceeds 10 percent, the test run (steps in paragraphs (d)(2) through (d)(8) of this section) must be repeated until an acceptable value is obtained.

(9) Repeat steps in paragraphs (d)(2) through (d)(8) of this section until the sampling effectiveness has been measured for all particle sizes specified in table F–2 of this subpart.

(10) Repeat steps in paragraphs (d)(1) through (d)(9) of this section until tests have been successfully conducted for both wind speeds of 2 km/hr and 24 km/hr.

(e) *Calculations*—(1) *Graphical treatment of effectiveness data*. For each wind speed given in table F–2 of this subpart, plot the particle average sampling effectiveness of the candidate sampler as a function of aerodynamic particle diameter ($D_{ae}$) on semi-logarithmic graph paper where the aerodynamic particle diameter is the particle size established by the parameters of the VOAG in conjunction with the known particle density. Construct a best-fit, smooth curve through the data by extrapolating the sampling effectiveness curve through 100 percent at an aerodynamic particle size of 0.5 μm and 0 percent at an aerodynamic particle size of 10 μm. Correction for the presence of multiplets shall be performed using the techniques presented by Marple, et al (1987). This multiplet-corrected effectiveness curve shall be used for all remaining calculations in this paragraph (e).

(2) *Cutpoint determination*. For each wind speed determine the sampler $Dp_{50}$ cutpoint defined as the aerodynamic particle size corresponding to 50 percent effectiveness from the multiplet corrected smooth curve.

(3) *Expected mass concentration calculation*. For each wind speed, calculate the estimated mass concentration measurement for the test sampler under each particle size distribution (Tables F–4, F–5, and F–6 of this subpart) and compare it to the mass concentration predicted for the reference sampler as follows:

(i) Determine the value of corrected effectiveness using the best-fit, multiplet-corrected curve at each of the particle sizes specified in the first column of table F–4 of this subpart. Record each corrected effectiveness value as a decimal between 0 and 1 in column 2 of table F–4 of this subpart.

(ii) Calculate the interval estimated mass concentration measurement by multiplying the values of corrected effectiveness in column 2 by the interval mass concentration values in column 3 and enter the products in column 4 of table F–4 of this subpart.

(iii) Calculate the estimated mass concentration measurement by summing the values in column 4 and entering the total as the estimated mass concentration measurement for the test sampler at the bottom of column 4 of table F–4 of this subpart.

(iv) Calculate the estimated mass concentration ratio between the candidate method and the reference method as:

EQUATION 14

$$R_c = \frac{C_{cand(est)}}{C_{ref(est)}} \times 100\%$$

where:

$C_{cand(est)}$ = estimated mass concentration measurement for the test sampler, μg/m³; and

$C_{ref(est)}$ = estimated mass concentration measurement for the reference sampler, μg/m³ (calculated for the reference sampler and specified at the bottom of column 7 of table F–4 of this subpart).

(v) Repeat steps in paragraphs (e) (1) through (e)(3) of this section for tables F–5 and F–6 of this subpart.

(f) *Evaluation of test results*. The candidate method passes the wind tunnel

effectiveness test if the $R_c$ value for each wind speed meets the specification in table F–1 of this subpart for each of the three particle size distributions.

### § 53.63 Test procedure: Wind tunnel inlet aspiration test.

(a) *Overview*. This test applies to a candidate sampler which differs from the reference method sampler only with respect to the design of the inlet. The purpose of this test is to ensure that the aspiration of a Class II candidate sampler is such that it representatively extracts an ambient aerosol at elevated wind speeds. This wind tunnel test uses a single-sized, liquid aerosol in conjunction with wind speeds of 2 km/hr and 24 km/hr. The test atmosphere concentration is alternately measured with the candidate sampler and a reference method device, both of which are operated without the 2.5-micron fractionation device installed. The test conditions are summarized in table F–2 of this subpart (under the heading of ''wind tunnel inlet aspiration test''). The candidate sampler must meet or exceed the acceptance criteria given in table F–1 of this subpart.

(b) *Technical definition*. Relative aspiration is the ratio (expressed as a percentage) of the aerosol mass concentration measured by the candidate sampler to that measured by a reference method sampler.

(c) *Facilities and equipment required*. The facilities and equipment are identical to those required for the full wind tunnel test (§ 53.62(c)).

(d) *Setup*. The candidate and reference method samplers shall be operated with the $PM_{2.5}$ fractionation device removed from the flow path throughout this entire test procedure. Modifications to accommodate this requirement shall be limited to removal of the fractionator and insertion of the filter holder directly into the downtube of the inlet.

(e) *Test procedure*—(1) *Establish the wind tunnel test atmosphere*. Follow the procedures in § 53.62(d)(1) through (d)(4) to establish a test atmosphere for one of the two wind speeds specified in table F–2 of this subpart.

(2) *Measure the aerosol concentration with the reference sampler*. (i) Install the reference sampler (or portion thereof) in the wind tunnel with the sampler inlet opening centered in the sampling zone. To meet the maximum blockage limit of § 53.62(c)(1) or for convenience, part of the test sampler may be positioned external to the wind tunnel provided that neither the geometry of the sampler nor the length of any connecting tube or pipe is altered. Collect particles for a time period such that the relative error of the measured concentration is less than 5.0 percent.

(ii) Determine the quantity of material collected with the reference method sampler using a calibrated fluorometer. Calculate and record the mass concentration as:

EQUATION 15

$$C_{ref(i)} = \frac{M_{ref(i)}}{Q_{(i)} \times t_{(i)}}$$

where:

i = replicate number;

$M_{ref}$ = mass of material collected with the reference method sampler;

Q = reference method sampler volumetric flow rate; and

t = sampling time.

(iii) Remove the reference method sampler from the tunnel.

(3) *Measure the aerosol concentration with the candidate sampler*. (i) Install the candidate sampler (or portion thereof) in the wind tunnel with the sampler inlet centered in the sampling zone. To meet the maximum blockage limit of § 53.62(c)(1) or for convenience, part of the test sampler may be positioned external to the wind tunnel provided that neither the geometry of the sampler nor the length of any connecting tube or pipe is altered. Collect particles for a time period such that the relative error of the measured concentration is less than 5.0 percent.

(ii) Determine the quantity of material collected with the candidate sampler using a calibrated fluorometer. Calculate and record the mass concentration as:

EQUATION 16

$$C_{cand(i)} = \frac{M_{cand(i)}}{Q_{(i)} \times t_{(i)}}$$

where:

i = replicate number;

$M_{cand}$ = mass of material collected with the candidate sampler;

Q = candidate sampler volumetric flow rate; and

t = sampling time.

(iii) Remove the candidate sampler from the wind tunnel.

(4) Repeat steps in paragraphs (d) (2) and (d)(3) of this section. Alternately measure the tunnel concentration with the reference sampler and the candidate sampler until four reference sampler and three candidate sampler measurements of the wind tunnel concentration are obtained.

(5) *Calculations*. (i) Calculate and record aspiration ratio for each candidate sampler run as:

EQUATION 17

$$A_{(i)} = \frac{C_{cand(i)}}{\left(C_{ref(i)} + C_{ref(i+1)}\right) \times \frac{1}{2}}$$

where:

i = replicate number.

(ii) Calculate and record the mean aspiration ratio as:

EQUATION 18

$$\overline{A} = \frac{\sum_{i=1}^{n} A_{(i)}}{n}$$

where:

i = replicate number; and

n = total number of measurements of aspiration ratio.

(iii) Precision of the aspiration ratio. (A) Calculate and record the precision of the aspiration ratio measurements as the coefficient of variation as:

EQUATION 19

$$CV_A = \frac{\sqrt{\sum_{i=1}^{n} A_{(i)}^2 - \frac{1}{n}\left(\sum_{i=1}^{n} A_{(i)}\right)^2}}{n-1} / \overline{A}_{(i)} \times 100\%$$

where:

i = replicate number; and

n = total number of measurements of aspiration ratio.

(B) If the value of $CV_A$ exceeds 10 percent, the entire test procedure must be repeated.

(f) *Evaluation of test results*. The candidate method passes the inlet aspiration test if all values of A meet the acceptance criteria specified in table F–1 of this subpart.

**§ 53.64 Test procedure: Static fractionator test.**

(a) *Overview*. This test applies only to those candidate methods in which the sole deviation from the reference method is in the design of the 2.5-micron fractionation device. The purpose of this test is to ensure that the fractionation characteristics of the candidate fractionator are acceptably similar to that of the reference method sampler. It is recognized that various methodologies exist for quantifying fractionator effectiveness. The following commonly-employed techniques are provided for purposes of guidance. Other methodologies for determining sampler effectiveness may be used contingent upon prior approval by the Agency.

(1) *Wash-off method*. Effectiveness is determined by measuring the aerosol mass deposited on the candidate sampler's after filter versus the aerosol mass deposited in the fractionator. The material deposited in the fractionator is recovered by washing its internal surfaces. For these wash-off tests, a fluorometer must be used to quantitate the aerosol concentration. Note that if this technique is chosen, the candidate must be reloaded with coarse aerosol prior to each test point when reevaluating the curve as specified in the loading test.

(2) *Static chamber method*. Effectiveness is determined by measuring the aerosol mass concentration sampled by

the candidate sampler's after filter versus that which exists in a static chamber. A calibrated fluorometer shall be used to quantify the collected aerosol deposits. The aerosol concentration is calculated as the measured aerosol mass divided by the sampled air volume.

(3) *Divided flow method*. Effectiveness is determined by comparing the aerosol concentration upstream of the candidate sampler's fractionator versus that concentration which exists downstream of the candidate fractionator. These tests may utilize either fluorometry or a real-time aerosol measuring device to determine the aerosol concentration.

(b) *Technical definition*. Effectiveness under static conditions is the ratio (expressed as a percentage) of the mass concentration of particles of a given size reaching the sampler filter to the mass concentration of particles of the same size existing in the test atmosphere.

(c) *Facilities and equipment required*—(1) *Aerosol generation*. Methods for generating aerosols shall be identical to those prescribed in §53.62(c)(2).

(2) *Particle delivery system*. Acceptable apparatus for delivering the generated aerosols to the candidate fractionator is dependent on the effectiveness measurement methodology and shall be defined as follows:

(i) *Wash-off test apparatus*. The aerosol may be delivered to the candidate fractionator through direct piping (with or without an in-line mixing chamber). Validation particle size and quality shall be conducted at a point directly upstream of the fractionator.

(ii) *Static chamber test apparatus*. The aerosol shall be introduced into a chamber and sufficiently mixed such that the aerosol concentration within the chamber is spatially uniform. The chamber must be of sufficient size to house at least four total filter samplers in addition to the inlet of the candidate method size fractionator. Validation of particle size and quality shall be conducted on representative aerosol samples extracted from the chamber.

(iii) *Divided flow test apparatus*. The apparatus shall allow the aerosol concentration to be measured upstream and downstream of the fractionator. The aerosol shall be delivered to a manifold with two symmetrical branching legs. One of the legs, referred to as the bypass leg, shall allow the challenge aerosol to pass unfractionated to the detector. The other leg shall accommodate the fractionation device.

(3) *Particle concentration measurement*—(i) *Fluorometry*. Refer to §53.62(c)(7).

(ii) *Number concentration measurement*. A number counting particle sizer may be used in conjunction with the divided flow test apparatus in lieu of fluorometric measurement. This device must have a minimum range of 1 to 10 μm, a resolution of 0.1 μm, and an accuracy of 0.15 μm such that primary particles may be distinguished from multiplets for all test aerosols. The measurement of number concentration shall be accomplished by integrating the primary particle peak.

(d) *Setup*—(1) *Remove the inlet and downtube from the candidate fractionator*. All tests procedures shall be conducted with the inlet and downtube removed from the candidate sampler.

(2) *Surface treatment of the fractionator*. Rinsing aluminum surfaces with alkaline solutions has been found to adversely affect subsequent fluorometric quantitation of aerosol mass deposits. If wash-off tests are to be used for quantifying aerosol penetration, internal surfaces of the fractionator must first be plated with electroless nickel. Specifications for this plating are specified in Society of Automotive Engineers Aerospace Material Specification (SAE AMS) 2404C, Electroless Nickel Plating (Reference 3 in appendix A of subpart F).

(e) *Test procedure: Wash-off method*—(1) *Clean the candidate sampler*. Note: The procedures in this step may be omitted if this test is being used to evaluate the fractionator after being loaded as specified in §53.65.

(i) Clean and dry the internal surfaces of the candidate sampler.

(ii) Prepare the internal fractionator surfaces in strict accordance with the operating instructions specified in the sampler's operating manual referred to in section 7.4.18 of 40 CFR part 50, appendix L.

(2) *Generate aerosol.* Follow the procedures for aerosol generation prescribed in § 53.62(d)(2).

(3) *Verify the quality of the test aerosol.* Follow the procedures for verification of test aerosol size and quality prescribed in § 53.62(d)(4).

(4) *Determine effectiveness for the particle size being produced.* (i) Collect particles downstream of the fractionator on an appropriate filter over a time period such that the relative error of the fluorometric measurement is less than 5.0 percent.

(ii) Determine the quantity of material collected on the after filter of the candidate method using a calibrated fluorometer. Calculate and record the aerosol mass concentration for the sampler filter as:

EQUATION 20

$$C_{cand(i)} = \frac{M_{cand(i)}}{Q_{(i)} \times t_{(i)}}$$

where:

i = replicate number;

$M_{cand}$ = mass of material collected with the candidate sampler;

Q = candidate sampler volumetric flowrate; and

t = sampling time.

(iii) Wash all interior surfaces upstream of the filter and determine the quantity of material collected using a calibrated fluorometer. Calculate and record the fluorometric mass concentration of the sampler wash as:

EQUATION 21

$$C_{wash(i)} = \frac{M_{wash(i)}}{Q_{(i)} \times t_{(i)}}$$

where:

i = replicate number;

$M_{wash}$ = mass of material washed from the interior surfaces of the fractionator;

Q = candidate sampler volumetric flowrate; and

t = sampling time.

(iv) Calculate and record the sampling effectiveness of the test sampler for this particle size as:

EQUATION 22

$$E_{(i)} = \frac{C_{wash(i)}}{C_{cand(i)} + C_{wash(i)}} \times 100\%$$

where:

i = replicate number.

(v) Repeat steps in paragraphs (e)(4) of this section, as appropriate, to obtain a minimum of three replicate measurements of sampling effectiveness. Note: The procedures for loading the candidate in § 53.65 must be repeated between repetitions if this test is being used to evaluate the fractionator after being loaded as specified in § 53.65.

(vi) Calculate and record the average sampling effectiveness of the test sampler as:

EQUATION 23

$$\overline{E} = \frac{\sum_{i=1}^{n} E_{(i)}}{n}$$

where:

i = replicate number; and

n = number of replicates.

(vii)(A) Calculate and record the coefficient of variation for the replicate sampling effectiveness measurements of the test sampler as:

EQUATION 24

$$CV_E = \frac{\sqrt{\sum_{i=1}^{n} E_{(i)}^2 - \frac{1}{n}\left(\sum_{i=1}^{n} E_{(i)}\right)^2}}{n-1} \times \frac{1}{\overline{E}} \times 100\%$$

where:

i = replicate number; and

n = total number of measurements.

(B) If the value of $CV_E$ exceeds 10 percent, then steps in paragraphs (e) (2) through (e)(4) of this section must be repeated.

(5) Repeat steps in paragraphs (e) (1) through (e)(4) of this section for each particle size specified in table F–2 of this subpart.

(f) *Test procedure: Static chamber method*—(1) *Generate aerosol*. Follow the procedures for aerosol generation prescribed in §53.62(d)(2).

(2) *Verify the quality of the test aerosol*. Follow the procedures for verification of test aerosol size and quality prescribed in §53.62(d)(4).

(3) *Introduce particles into chamber*. Introduce the particles into the static chamber and allow the particle concentration to stabilize.

(4) *Install and operate the candidate sampler's fractionator and its after-filter and at least four total filters*. (i) Install the fractionator and an array of four or more equally spaced total filter samplers such that the total filters surround and are in the same plane as the inlet of the fractionator.

(ii) Simultaneously collect particles onto appropriate filters with the total filter samplers and the fractionator for a time period such that the relative error of the measured concentration is less than 5.0 percent.

(5) *Calculate the aerosol spatial uniformity in the chamber*. (i) Determine the quantity of material collected with each total filter sampler in the array using a calibrated fluorometer. Calculate and record the mass concentration for each total filter sampler as:

EQUATION 25

$$C_{total(ij)} = \frac{M_{total(ij)}}{Q_{(ij)} \times t_{(ij)}}$$

where:

i = replicate number;
j = total filter sampler number;
$M_{total}$ = mass of material collected with the total filter sampler;
Q = total filter sampler volumetric flowrate; and
t = sample time.

(ii) Calculate and record the mean mass concentration as:

EQUATION 26

$$\overline{C}_{total(i)} = \frac{\sum_{j=1}^{n} C_{total(ij)}}{n}$$

where:

n = total number of samplers;
i = replicate number; and
j = filter sampler number.

(iii) (A) Calculate and record the coefficient of variation of the total mass concentration as:

EQUATION 27

$$CV_{total} = \frac{\sqrt{\sum_{j=1}^{n} C^2_{total(ij)} - \frac{1}{n}\left(\sum_{j=1}^{n} C_{total(ij)}\right)^2}}{n-1} \times \frac{1}{\overline{C}_{total(i)}} \times 100\%$$

where:

i = replicate number;
j = total filter sampler number; and
n = number of total filter samplers.

(B) If the value of $CV_{total}$ exceeds 10 percent, then the particle concentration uniformity is unacceptable, alterations to the static chamber test apparatus must be made, and steps in paragraphs (f)(1) through (f)(5) of this section must be repeated.

(6) *Determine the effectiveness of the candidate sampler*. (i) Determine the quantity of material collected on the candidate sampler's after filter using a calibrated fluorometer. Calculate and record the mass concentration for the candidate sampler as:

EQUATION 28

$$C_{cand(i)} = \frac{M_{cand(i)}}{Q_{(i)} \times t_{(i)}}$$

where:

i = replicate number;
$M_{cand}$ = mass of material collected with the candidate sampler;
Q = candidate sampler volumetric flowrate; and
t = sample time.

(ii) Calculate and record the sampling effectiveness of the candidate sampler as:

EQUATION 29

$$E_{(i)} = \frac{C_{cand(i)}}{\overline{C}_{total(i)}} \times 100\%$$

where:
i = replicate number.

(iii) Repeat step in paragraph (f)(4) through (f)(6) of this section, as appropriate, to obtain a minimum of three replicate measurements of sampling effectiveness.

(iv) Calculate and record the average sampling effectiveness of the test sampler as:

EQUATION 30

$$\overline{E} = \frac{\sum_{i=1}^{n} E_{(i)}}{n}$$

where:
i= replicate number.

(v)(A) Calculate and record the coefficient of variation for the replicate sampling effectiveness measurements of the test sampler as:

EQUATION 31

$$CV_E = \frac{\sqrt{\sum_{i=1}^{n} E_{(i)}^2 - \frac{1}{n}\left(\sum_{i=1}^{n} E_{(i)}\right)^2}}{n-1} \times \frac{1}{\overline{E}} \times 100\%$$

where:
i = replicate number; and
n = number of measurements of effectiveness.

(B) If the value of $CV_E$ exceeds 10 percent, then the test run (steps in paragraphs (f)(2) through (f)(6) of this section) is unacceptable and must be repeated.

(7) Repeat steps in paragraphs (f)(1) through (f)(6) of this section for each particle size specified in table F–2 of this subpart.

(g) *Test procedure: Divided flow method*—(1) *Generate calibration aerosol.* Follow the procedures for aerosol generation prescribed in § 53.62(d)(2).

(2) *Verify the quality of the calibration aerosol.* Follow the procedures for verification of calibration aerosol size and quality prescribed in § 53.62(d)(4).

(3) *Introduce aerosol.* Introduce the calibration aerosol into the static chamber and allow the particle concentration to stabilize.

(4) *Validate that transport is equal for the divided flow option.* (i) With fluorometry as a detector:

(A) Install a total filter on each leg of the divided flow apparatus.

(B) Collect particles simultaneously through both legs at 16.7 L/min onto an appropriate filter for a time period such that the relative error of the measured concentration is less than 5.0 percent.

(C) Determine the quantity of material collected on each filter using a calibrated fluorometer. Calculate and record the mass concentration measured in each leg as:

EQUATION 32

$$C_{(i)} = \frac{M_{(i)}}{Q_{(i)} \times t_{(i)}}$$

where:
i = replicate number,
M = mass of material collected with the total filter; and
Q = candidate sampler volumetric flowrate.

(D) Repeat steps in paragraphs (g)(4)(i)(A) through (g)(4)(i)(C) of this section until a minimum of three replicate measurements are performed.

(ii) With an aerosol number counting device as a detector:

(A) Remove all flow obstructions from the flow paths of the two legs.

(B) Quantify the aerosol concentration of the primary particles in each leg of the apparatus.

(C) Repeat steps in paragraphs (g)(4)(ii)(A) through (g)(4)(ii)(B) of this section until a minimum of three replicate measurements are performed.

(iii) (A) Calculate the mean concentration and coefficient of variation as:

EQUATION 33

$$\overline{C} = \frac{\sum_{i=1}^{n} C_{(i)}}{n}$$

EQUATION 34

$$CV = \frac{\sqrt{\sum_{i=1}^{n} C_{(i)}^2 - \frac{1}{n}\left(\sum_{i=1}^{n} C_{(i)}\right)^2}}{n-1} \times \frac{1}{\overline{C}} \times 100\%$$

where:

i = replicate number; and

n = number of replicates.

(B) If the measured mean concentrations through the two legs do not agree within 5 percent, then adjustments may be made in the setup, and this step must be repeated.

(5) *Determine effectiveness.* Determine the sampling effectiveness of the test sampler with the inlet removed by one of the following procedures:

(i) With fluorometry as a detector:

(A) Prepare the divided flow apparatus for particle collection. Install a total filter into the bypass leg of the divided flow apparatus. Install the particle size fractionator with a total filter placed immediately downstream of it into the other leg.

(B) Collect particles simultaneously through both legs at 16.7 L/min onto appropriate filters for a time period such that the relative error of the measured concentration is less than 5.0 percent.

(C) Determine the quantity of material collected on each filter using a calibrated fluorometer. Calculate and record the mass concentration measured by the total filter and that measured after penetrating through the candidate fractionator as follows:

EQUATION 35

$$C_{total_{(i)}} = \frac{M_{total(i)}}{Q_{(i)} \times t_{(i)}}$$

EQUATION 36

$$C_{cand_{(i)}} = \frac{M_{cand(i)}}{Q_{(i)} \times t_{(i)}}$$

where:

i = replicate number.

(ii) With a number counting device as a detector:

(A) Install the particle size fractionator into one of the legs of the divided flow apparatus.

(B) Quantify and record the aerosol number concentration of the primary particles passing through the fractionator as $C_{cand(i)}$.

(C) Divert the flow from the leg containing the candidate fractionator to the bypass leg. Allow sufficient time for the aerosol concentration to stabilize.

(D) Quantify and record the aerosol number concentration of the primary particles passing through the bypass leg as $C_{total(i)}$.

(iii) Calculate and record sampling effectiveness of the candidate sampler as:

EQUATION 37

$$E_{(i)} = \frac{C_{cand(i)}}{\overline{C}_{total(i)}} \times 100\%$$

where:

i = replicate number.

(6) Repeat step in paragraph (g)(5) of this section, as appropriate, to obtain a minimum of three replicate measurements of sampling effectiveness.

(7) *Calculate the mean and coefficient of variation for replicate measurements of effectiveness.* (i) Calculate and record the mean sampling effectiveness of the candidate sampler as:

EQUATION 38

$$\overline{E} = \frac{\sum_{i=1}^{n} E_{(i)}}{n}$$

where:

i = replicate number.

(ii)(A) Calculate and record the coefficient of variation for the replicate sampling effectiveness measurements of the candidate sampler as:

EQUATION 39

$$CV_E = \frac{\sqrt{\sum_{i=1}^{n} E_{(i)}^2 - \frac{1}{n}\left(\sum_{i=1}^{n} E_{(i)}\right)^2}}{n-1} \times \frac{1}{\overline{E}} \times 100\%$$

where:

i = replicate number; and
n = number of replicates.

(B) If the coefficient of variation is not less than 10 percent, then the test run must be repeated (steps in paragraphs (g)(1) through (g)(7) of this section).

(8) Repeat steps in paragraphs (g)(1) through (g)(7) of this section for each particle size specified in table F–2 of this subpart.

(h) *Calculations*—(1) *Treatment of multiplets*. For all measurements made by fluorometric analysis, data shall be corrected for the presence of multiplets as described in § 53.62(f)(1). Data collected using a real-time device (as described in paragraph (c)(3)(ii)) of this section will not require multiplet correction.

(2) *Cutpoint determination*. For each wind speed determine the sampler $Dp_{50}$ cutpoint defined as the aerodynamic particle size corresponding to 50 percent effectiveness from the multiplet corrected smooth curve.

(3) *Graphical analysis and numerical integration with ambient distributions*. Follow the steps outlined in § 53.62 (e)(3) through (e)(4) to calculate the estimated concentration measurement ratio between the candidate sampler and a reference method sampler.

(i) *Test evaluation*. The candidate method passes the static fractionator test if the values of Rc and $Dp_{50}$ for each distribution meets the specifications in table F–1 of this subpart.

[62 FR 38814, July 18, 1997; 63 FR 7714, Feb. 17, 1998]

### § 53.65 Test procedure: Loading test.

(a) *Overview*. (1) The loading tests are designed to quantify any appreciable changes in a candidate method sampler's performance as a function of coarse aerosol collection. The candidate sampler is exposed to a mass of coarse aerosol equivalent to sampling a mass concentration of 150 μg/m³ over the time period that the manufacturer has specified between periodic cleaning. After loading, the candidate sampler is then evaluated by performing the test in § 53.62 (full wind tunnel test), § 53.63 (wind tunnel inlet aspiration test), or § 53.64 (static fractionator test). If the acceptance criteria are met for this evaluation test, then the candidate sampler is approved for multiday sampling with the periodic maintenance schedule as specified by the candidate method. For example, if the candidate sampler passes the reevaluation tests following loading with an aerosol mass equivalent to sampling a 150 μg/m³ aerosol continuously for 7 days, then the sampler is approved for 7 day field operation before cleaning is required.

(2) [Reserved]

(b) *Technical definition*. Effectiveness after loading is the ratio (expressed as a percentage) of the mass concentration of particles of a given size reaching the sampler filter to the mass concentration of particles of the same size approaching the sampler.

(c) *Facilities and equipment required*—(1) *Particle delivery system*. The particle delivery system shall consist of a static chamber or a low velocity wind tunnel having a sufficiently large cross-sectional area such that the test sampler, or portion thereof, may be installed in the test section. At a minimum, the system must have a sufficiently large cross section to house the candidate sampler inlet as well as a collocated isokinetic nozzle for measuring total aerosol concentration. The mean velocity in the test section of the static chamber or wind tunnel shall not exceed 2 km/hr.

(2) *Aerosol generation equipment*. For purposes of these tests, the test aerosol shall be produced from commercially available, bulk Arizona road dust. To provide direct interlaboratory comparability of sampler loading characteristics, the bulk dust is specified as 0-10 μm ATD available from Powder Technology Incorporated (Burnsville, MN). A fluidized bed aerosol generator,

Wright dust feeder, or sonic nozzle shall be used to efficiently deagglomerate the bulk test dust and transform it into an aerosol cloud. Other dust generators may be used contingent upon prior approval by the Agency.

(3) *Isokinetic sampler*. Mean aerosol concentration within the static chamber or wind tunnel shall be established using a single isokinetic sampler containing a preweighed high-efficiency total filter.

(4) *Analytic balance*. An analytical balance shall be used to determine the weight of the total filter in the isokinetic sampler. The precision and accuracy of this device shall be such that the relative measurement error is less than 5.0 percent for the difference between the initial and final weight of the total filter. The identical analytic balance shall be used to perform both initial and final weighing of the total filter.

(d) *Test procedure*. (1) Calculate and record the target time weighted concentration of Arizona road dust which is equivalent to exposing the sampler to an environment of 150 μg/m³ over the time between cleaning specified by the candidate sampler's operations manual as:

EQUATION 40

$$\text{Target TWC} = 150\,\mu g/m^3 \times t$$

where:

t = the number of hours specified by the candidate method prior to periodic cleaning.

(2) Clean the candidate sampler. (i) Clean and dry the internal surfaces of the candidate sampler.

(ii) Prepare the internal surfaces in strict accordance with the operating manual referred to in section 7.4.18 of 40 CFR part 50, appendix L.

(3) Determine the preweight of the filter that shall be used in the isokinetic sampler. Record this value as InitWt.

(4) Install the candidate sampler's inlet and the isokinetic sampler within the test chamber or wind tunnel.

(5) Generate a dust cloud. (i) Generate a dust cloud composed of Arizona test dust.

(ii) Introduce the dust cloud into the chamber.

(iii) Allow sufficient time for the particle concentration to become steady within the chamber.

(6) Sample aerosol with a total filter and the candidate sampler. (i) Sample the aerosol for a time sufficient to produce an equivalent TWC equal to that of the target TWC ±15 percent.

(ii) Record the sampling time as t.

(7) Determine the time weighted concentration. (i) Determine the postweight of the isokinetic sampler's total filter.

(ii) Record this value as FinalWt.

(iii) Calculate and record the TWC as:

EQUATION 41

$$TWC = \frac{(FinalWt - InitWt) \times t}{Q}$$

where:

Q = the flow rate of the candidate method.

(iv) If the value of TWC deviates from the target TWC ±15 percent, then the loaded mass is unacceptable and the entire test procedure must be repeated.

(8) Determine the candidate sampler's effectiveness after loading. The candidate sampler's effectiveness as a function of particle aerodynamic diameter must then be evaluated by performing the test in §53.62 (full wind tunnel test). A sampler which fits the category of inlet deviation in §53.60(e)(1) may opt to perform the test in §53.63 (inlet aspiration test) in lieu of the full wind tunnel test. A sampler which fits the category of fractionator deviation in §53.60(e)(2) may opt to perform the test in §53.64 (static fractionator test) in lieu of the full wind tunnel test.

(e) *Test results*. If the candidate sampler meets the acceptance criteria for the evaluation test performed in paragraph (d)(8) of this section, then the candidate sampler passes this test with the stipulation that the sampling train be cleaned as directed by and as frequently as that specified by the candidate sampler's operations manual.

**§53.66 Test procedure: Volatility test.**

(a) *Overview*. This test is designed to ensure that the candidate method's losses due to volatility when sampling

semi-volatile ambient aerosol will be comparable to that of a federal reference method sampler. This is accomplished by challenging the candidate sampler with a polydisperse, semi-volatile liquid aerosol in three distinct phases. During phase A of this test, the aerosol is elevated to a steady-state, test-specified mass concentration and the sample filters are conditioned and preweighed. In phase B, the challenge aerosol is simultaneously sampled by the candidate method sampler and a reference method sampler onto the preweighed filters for a specified time period. In phase C (the blow-off phase), aerosol and aerosol-vapor free air is sampled by the samplers for an additional time period to partially volatilize the aerosol on the filters. The candidate sampler passes the volatility test if the acceptance criteria presented in table F–1 of this subpart are met or exceeded.

(b) *Technical definitions.* (1) Residual mass (RM) is defined as the weight of the filter after the blow-off phase subtracted from the initial weight of the filter.

(2) Corrected residual mass (CRM) is defined as the residual mass of the filter from the candidate sampler multiplied by the ratio of the reference method flow rate to the candidate method flow rate.

(c) *Facilities and equipment required*—(1) *Environmental chamber.* Because the nature of a volatile aerosol is greatly dependent upon environmental conditions, all phases of this test shall be conducted at a temperature of 22.0 ±0.5 °C and a relative humidity of 40 ±3 percent. For this reason, it is strongly advised that all weighing and experimental apparatus be housed in an environmental chamber capable of this level of control.

(2) *Aerosol generator.* The aerosol generator shall be a pressure nebulizer operated at 20 to 30 psig (140 to 207 kPa) to produce a polydisperse, semi-voltile aerosol with a mass median diameter larger than 1 μm and smaller than 2.5 μm. The nebulized liquid shall be A.C.S. reagent grade glycerol ($C_3H_8O$, FW = 92.09, CAS 56–81–5) of 99.5 percent minimum purity. For the purpose of this test the accepted mass median diameter is predicated on the stable aerosol inside the internal chamber and not on the aerosol emerging from the nebulizer nozzle. Aerosol monitoring and its stability are described in (c)(3) and (c)(4) of this section.

(3) *Aerosol monitoring equipment.* The evaporation and condensation dynamics of a volatile aerosol is greatly dependent upon the vapor pressure of the volatile component in the carrier gas. The size of an aerosol becomes fixed only when an equilibrium is established between the aerosol and the surrounding vapor; therefore, aerosol size measurement shall be used as a surrogate measure of this equilibrium. A suitable instrument with a range of 0.3 to 10 μm, an accuracy of 0.5 μm, and a resolution of 0.2 μm (e.g., an optical particle sizer, or a time-of-flight instrument) shall be used for this purpose. The parameter monitored for stability shall be the mass median instrument measured diameter (i.e. optical diameter if an optical particle counter is used). A stable aerosol shall be defined as an aerosol with a mass median diameter that has changed less than 0.25 μm over a 4 hour time period.

(4) *Internal chamber.* The time required to achieve a stable aerosol depends upon the time during which the aerosol is resident with the surrounding air. This is a function of the internal volume of the aerosol transport system and may be facilitated by recirculating the challenge aerosol. A chamber with a volume of 0.5 $m^3$ and a recirculating loop (airflow of approximately 500 cfm) is recommended for this purpose. In addition, a baffle is recommended to dissipate the jet of air that the recirculating loop can create. Furthermore, a HEPA filtered hole in the wall of the chamber is suggested to allow makeup air to enter the chamber or excess air to exit the chamber to maintain a system flow balance. The concentration inside the chamber shall be maintained at 1 $mg/m^3$ ±20 percent to obtain consistent and significant filter loading.

(5) *Aerosol sampling manifold.* A manifold shall be used to extract the aerosol from the area in which it is equilibrated and transport it to the candidate method sampler, the reference

method sampler, and the aerosol monitor. The losses in each leg of the manifold shall be equivalent such that the three devices will be exposed to an identical aerosol.

(6) *Chamber air temperature recorders.* Minimum range 15-25 °C, certified accuracy to within 0.2 °C, resolution of 0.1 °C. Measurement shall be made at the intake to the sampling manifold and adjacent to the weighing location.

(7) *Chamber air relative humidity recorders.* Minimum range 30 - 50 percent, certified accuracy to within 1 percent, resolution of 0.5 percent. Measurement shall be made at the intake to the sampling manifold and adjacent to the weighing location.

(8) *Clean air generation system.* A source of aerosol and aerosol-vapor free air is required for phase C of this test. This clean air shall be produced by filtering air through an absolute (HEPA) filter.

(9) *Balance.* Minimum range 0 - 200 mg, certified accuracy to within 10 μg, resolution of 1 μg.

(d) *Additional filter handling conditions*—(1) *Filter handling.* Careful handling of the filter during sampling, conditioning, and weighing is necessary to avoid errors due to damaged filters or loss of collected particles from the filters. All filters must be weighed immediately after phase A dynamic conditioning and phase C.

(2) *Dynamic conditioning of filters.* Total dynamic conditioning is required prior to the initial weight determined in phase A. Dynamic conditioning refers to pulling clean air from the clean air generation system through the filters. Total dynamic conditioning can be established by sequential filter weighing every 30 minutes following repetitive dynamic conditioning. The filters are considered sufficiently conditioned if the sequential weights are repeatable to ±3 μg.

(3) *Static charge.* The following procedure is suggested for minimizing charge effects. Place six or more Polonium static control devices (PSCD) inside the microbalance weighing chamber, (MWC). Two of them must be placed horizontally on the floor of the MWC and the remainder placed vertically on the back wall of the MWC. Taping two PSCD's together or using double-sided tape will help to keep them from falling. Place the filter that is to be weighed on the horizontal PSCDs facing aerosol coated surface up. Close the MWC and wait 1 minute. Open the MWC and place the filter on the balance dish. Wait 1 minute. If the charges have been neutralized the weight will stabilize within 30-60 seconds. Repeat the procedure of neutralizing charges and weighing as prescribed above several times (typically 2-4 times) until consecutive weights will differ by no more than 3 micrograms. Record the last measured weight and use this value for all subsequent calculations.

(e) *Test procedure*—(1) *Phase A - Preliminary steps.* (i) Generate a polydisperse glycerol test aerosol.

(ii) Introduce the aerosol into the transport system.

(iii) Monitor the aerosol size and concentration until stability and level have been achieved.

(iv) Condition the candidate method sampler and reference method sampler filters until total dynamic conditioning is achieved as specified in paragraph (d)(2) of this section.

(v) Record the dynamically conditioned weight as $InitWt_c$ and $InitWt_r$ where c is the candidate method sampler and r is the reference method sampler.

(2) *Phase B - Aerosol loading.* (i) Install the dynamically conditioned filters into the appropriate samplers.

(ii) Attach the samplers to the manifold.

(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.

(3) *Phase C - Blow-off.* (i) Alter the intake of the samplers to sample air from the clean air generation system.

(ii) Sample clean air for one of the required blow-off time durations (1, 2, 3, and 4 hours).

(iii) Remove the filters from the samplers.

(iv) Weigh the filters immediately and record this weight, $FinalWt_c$ and $FinalWt_r$, where c is the candidate

method sampler and r is the reference method sampler.

(v) Calculate the residual mass for the reference method sampler:

EQUATION 41A

$$RM_{(ij)} = \left(FinalWt_r - InitWt_r\right)$$

where:

i = repetition number; and
j = blow-off time period.

(vi) Calculate the corrected residual mass for the candidate method sampler as:

EQUATION 41B

$$CRM_{(ij)} = \left(FinalWt_r - InitWt_r\right) \times \frac{Q_r}{Q_c}$$

where:

i = repetition number;
j = blow-off time period;
$Q_c$ = candidate method sampler flow rate, and
$Q_r$ = reference method sampler flow rate.

(4) Repeat steps in paragraph (e)(1) through (e)(3) of this section until three repetitions have been completed for each of the required blow-off time durations (1, 2, 3, and 4 hours).

(f) *Calculations and analysis.* (1) Perform a linear regression with the candidate method CRM as the dependent variable and the reference method RM as the independent variable.

(2) Determine the following regression parameters: slope, intercept, and correlation coefficient (r).

(g) *Test results.* The candidate method passes the volatility test if the regression parameters meet the acceptance criteria specified in table F–1 of this subpart.

[62 FR 38814, July 18, 1997, as amended at 71 FR 61295, Oct. 17, 2006]

TABLE F–1 TO SUBPART F OF PART 53—PERFORMANCE SPECIFICATIONS FOR $PM_{2.5}$ CLASS II EQUIVALENT SAMPLERS

| Performance test | Specifications | Acceptance criteria |
|---|---|---|
| § 53.62 Full 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 produced by air nebulization of A.C.S. reagent grade glycerol, 99.5% minimum purity. | Regression Parameters Slope = 1 ± 0.1, Intercept = 0 ± ? 0.15mg r ≥ 0.97. |

[71 FR 61295, Oct. 17, 2006]

EFFECTIVE DATE NOTE: At 72 FR 32209, June 12, 2007, Table F–1 to subpart F of part 53 was revised, effective Sept. 10, 2007. For the convenience of the user, the revised text is set forth as follows:

TABLE F–1 TO SUBPART F OF PART 53.—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%. |

| Performance test | Specifications | Acceptance criteria |
|---|---|---|
| § 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 produced 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. |

TABLE F–2 TO SUBPART F OF PART 53—PARTICLE SIZES AND WIND SPEEDS FOR FULL WIND TUNNEL TEST, WIND TUNNEL INLET ASPIRATION TEST, AND STATIC CHAMBER TEST

| Primary Partical Mean Size[a] (μm) | Full Wind Tunnel Test | | Inlet Aspiration Test | | Static Fractionator Test | Volatility Test |
|---|---|---|---|---|---|---|
| | 2 km/hr | 24 km/hr | 2 km/hr | 24 km/hr | | |
| 1.5±0.25 | S | S | | | S | |
| 2.0±0.25 | S | S | | | S | |
| 2.2±0.25 | S | S | | | S | |
| 2.5±0.25 | S | S | | | S | |
| 2.8±0.25 | S | S | | | S | |
| 3.0±0.25 | | | L | L | | |
| 3.5±0.25 | S | S | | | S | |
| 4.0±0.5 | S | S | | | S | |
| Polydisperse Glycerol Aerosol | | | | L | | |

[a] Aerodynamic diameter.
S=Solid particles.
L=Liquid particles.

TABLE F–3 TO SUBPART F OF PART 53—CRITICAL PARAMETERS OF IDEALIZED AMBIENT PARTICLE SIZE DISTRIBUTIONS

| Idealized Distribution | Fine Particle Mode | | | Coarse Particle Mode | | | $PM_{2.5}/PM_{10}$ Ratio | FRM Sampler Expected Mass Conc. (μg/m³) |
|---|---|---|---|---|---|---|---|---|
| | MMD (μm) | Geo. Std. Dev. | Conc. (μg/m³) | MMD (μm) | Geo. Std. Dev. | Conc. (μg/m³) | | |
| Coarse | 0.50 | 2 | 12.0 | 10 | 2 | 88.0 | 0.27 | 13.814 |
| "Typical" | 0.50 | 2 | 33.3 | 10 | 2 | 66.7 | 0.55 | 34.284 |
| Fine | 0.85 | 2 | 85.0 | 15 | 2 | 15.0 | 0.94 | 78.539 |

TABLE F–4 TO SUBPART F OF PART 53—ESTIMATED MASS CONCENTRATION MEASUREMENT OF $PM_{2.5}$ FOR IDEALIZED COARSE AEROSOL SIZE DISTRIBUTION

| Particle Aerodynamic Diameter (μm) | Test Sampler | | | Ideal Sampler | | |
|---|---|---|---|---|---|---|
| | Fractional Sampling Effectiveness | Interval Mass Concentration (μg/m³) | Estimated Mass Concentration Measurement (μg/m³) | Fractional Sampling Effectiveness | Interval Mass Concentration (μg/m³) | Estimated Mass Concentration Measurement (μg/m³) |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| <0.500 | 1.000 | 6.001 | | 1.000 | 6.001 | 6.001 |
| 0.625 | | 2.129 | | 0.999 | 2.129 | 2.127 |
| 0.750 | | 0.982 | | 0.998 | 0.982 | 0.980 |
| 0.875 | | 0.730 | | 0.997 | 0.730 | 0.728 |
| 1.000 | | 0.551 | | 0.995 | 0.551 | 0.548 |
| 1.125 | | 0.428 | | 0.991 | 0.428 | 0.424 |
| 1.250 | | 0.346 | | 0.987 | 0.346 | 0.342 |
| 1.375 | | 0.294 | | 0.980 | 0.294 | 0.288 |
| 1.500 | | 0.264 | | 0.969 | 0.264 | 0.256 |
| 1.675 | | 0.251 | | 0.954 | 0.251 | 0.239 |
| 1.750 | | 0.250 | | 0.932 | 0.250 | 0.233 |
| 1.875 | | 0.258 | | 0.899 | 0.258 | 0.232 |
| 2.000 | | 0.272 | | 0.854 | 0.272 | 0.232 |
| 2.125 | | 0.292 | | 0.791 | 0.292 | 0.231 |
| 2.250 | | 0.314 | | 0.707 | 0.314 | 0.222 |
| 2.375 | | 0.339 | | 0.602 | 0.339 | 0.204 |
| 2.500 | | 0.366 | | 0.480 | 0.366 | 0.176 |
| 2.625 | | 0.394 | | 0.351 | 0.394 | 0.138 |

| Particle Aerodynamic Diameter (μm) | Test Sampler | | | Ideal Sampler | | |
|---|---|---|---|---|---|---|
| | Fractional Sampling Effectiveness | Interval Mass Concentration (μg/m³) | Estimated Mass Concentration Measurement (μg/m³) | Fractional Sampling Effectiveness | Interval Mass Concentration (μg/m³) | Estimated Mass Concentration Measurement (μg/m³) |
| 2.750 | | 0.422 | | 0.230 | 0.422 | 0.097 |
| 2.875 | | 0.449 | | 0.133 | 0.449 | 0.060 |
| 3.000 | | 0.477 | | 0.067 | 0.477 | 0.032 |
| 3.125 | | 0.504 | | 0.030 | 0.504 | 0.015 |
| 3.250 | | 0.530 | | 0.012 | 0.530 | 0.006 |
| 3.375 | | 0.555 | | 0.004 | 0.555 | 0.002 |
| 3.500 | | 0.579 | | 0.001 | 0.579 | 0.001 |
| 3.625 | | 0.602 | | 0.000000 | 0.602 | 0.000000 |
| 3.750 | | 0.624 | | 0.000000 | 0.624 | 0.000000 |
| 3.875 | | 0.644 | | 0.000000 | 0.644 | 0.000000 |
| 4.000 | | 0.663 | | 0.000000 | 0.663 | 0.000000 |
| 4.125 | | 0.681 | | 0.000000 | 0.681 | 0.000000 |
| 4.250 | | 0.697 | | 0.000000 | 0.697 | 0.000000 |
| 4.375 | | 0.712 | | 0.000000 | 0.712 | 0.000000 |
| 4.500 | | 0.726 | | 0.000000 | 0.726 | 0.000000 |
| 4.625 | | 0.738 | | 0.000000 | 0.738 | 0.000000 |
| 4.750 | | 0.750 | | 0.000000 | 0.750 | 0.000000 |
| 4.875 | | 0.760 | | 0.000000 | 0.760 | 0.000000 |
| 5.000 | | 0.769 | | 0.000000 | 0.769 | 0.000000 |
| 5.125 | | 0.777 | | 0.000000 | 0.777 | 0.000000 |
| 5.250 | | 0.783 | | 0.000000 | 0.783 | 0.000000 |
| 5.375 | | 0.789 | | 0.000000 | 0.789 | 0.000000 |
| 5.500 | | 0.794 | | 0.000000 | 0.794 | 0.000000 |
| 5.625 | | 0.798 | | 0.000000 | 0.798 | 0.000000 |
| 5.75 | | 0.801 | | 0.000000 | 0.801 | 0.000000 |
| | | $C_{sam(exp)}$= | | | $C_{ideal(exp)}$= | 13.814 |

TABLE F–5 TO SUBPART F OF PART 53—ESTIMATED MASS CONCENTRATION MEASUREMENT OF $PM_{2.5}$ FOR IDEALIZED ''TYPICAL'' COARSE AEROSOL SIZE DISTRIBUTION

| Particle Aerodynamic Diameter (μm) | Test Sampler | | | Ideal Sampler | | |
|---|---|---|---|---|---|---|
| | Fractional Sampling Effectiveness | Interval Mass Concentration (μg/m³) | Estimated Mass Concentration Measurement (μg/m³) | Fractional Sampling Effectiveness | Interval Mass Concentration (μg/m³) | Estimated Mass Concentration Measurement (μg/m³) |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| <0.500 | 1.000 | 16.651 | | 1.000 | 16.651 | 16.651 |
| 0.625 | | 5.899 | | 0.999 | 5.899 | 5.893 |
| 0.750 | | 2.708 | | 0.998 | 2.708 | 2.703 |
| 0.875 | | 1.996 | | 0.997 | 1.996 | 1.990 |
| 1.000 | | 1.478 | | 0.995 | 1.478 | 1.471 |
| 1.125 | | 1.108 | | 0.991 | 1.108 | 1.098 |
| 1.250 | | 0.846 | | 0.987 | 0.846 | 0.835 |
| 1.375 | | 0.661 | | 0.980 | 0.661 | 0.648 |
| 1.500 | | 0.532 | | 0.969 | 0.532 | 0.516 |
| 1.675 | | 0.444 | | 0.954 | 0.444 | 0.424 |
| 1.750 | | 0.384 | | 0.932 | 0.384 | 0.358 |
| 1.875 | | 0.347 | | 0.899 | 0.347 | 0.312 |
| 2.000 | | 0.325 | | 0.854 | 0.325 | 0.277 |
| 2.125 | | 0.314 | | 0.791 | 0.314 | 0.248 |
| 2.250 | | 0.312 | | 0.707 | 0.312 | 0.221 |
| 2.375 | | 0.316 | | 0.602 | 0.316 | 0.190 |
| 2.500 | | 0.325 | | 0.480 | 0.325 | 0.156 |
| 2.625 | | 0.336 | | 0.351 | 0.336 | 0.118 |
| 2.750 | | 0.350 | | 0.230 | 0.350 | 0.081 |
| 2.875 | | 0.366 | | 0.133 | 0.366 | 0.049 |
| 3.000 | | 0.382 | | 0.067 | 0.382 | 0.026 |
| 3.125 | | 0.399 | | 0.030 | 0.399 | 0.012 |
| 3.250 | | 0.416 | | 0.012 | 0.416 | 0.005 |
| 3.375 | | 0.432 | | 0.004 | 0.432 | 0.002 |
| 3.500 | | 0.449 | | 0.001 | 0.449 | 0.000000 |
| 3.625 | | 0.464 | | 0.000000 | 0.464 | 0.000000 |
| 3.750 | | 0.480 | | 0.000000 | 0.480 | 0.000000 |

| Particle Aerodynamic Diameter (μm) | Test Sampler | | | Ideal Sampler | | |
|---|---|---|---|---|---|---|
| | Fractional Sampling Effectiveness | Interval Mass Concentration (μg/m³) | Estimated Mass Concentration Measurement (μg/m³) | Fractional Sampling Effectiveness | Interval Mass Concentration (μg/m³) | Estimated Mass Concentration Measurement (μg/m³) |
| 3.875 | | 0.494 | | 0.000000 | 0.494 | 0.000000 |
| 4.000 | | 0.507 | | 0.000000 | 0.507 | 0.000000 |
| 4.125 | | 0.520 | | 0.000000 | 0.520 | 0.000000 |
| 4.250 | | | | 0.000000 | 0.532 | 0.000000 |
| 4.375 | | | | 0.000000 | 0.543 | 0.000000 |
| 4.500 | | | | 0.000000 | 0.553 | 0.000000 |
| 4.625 | | | | 0.000000 | 0.562 | 0.000000 |
| 4.750 | | | | 0.000000 | 0.570 | 0.000000 |
| 4.875 | | | | 0.000000 | 0.577 | 0.000000 |
| 5.000 | | | | 0.000000 | 0.584 | 0.000000 |
| 5.125 | | | | 0.000000 | 0.590 | 0.000000 |
| 5.250 | | | | 0.000000 | 0.595 | 0.000000 |
| 5.375 | | | | 0.000000 | 0.599 | 0.000000 |
| 5.500 | | | | 0.000000 | 0.603 | 0.000000 |
| 5.625 | | | | 0.000000 | 0.605 | 0.000000 |
| 5.75 | | | | 0.000000 | 0.608 | 0.000000 |
| | | $C_{sam(exp)}$= | | | $C_{ideal(exp)}$= | 34.284 |

TABLE F–6 TO SUBPART F OF PART 53—ESTIMATED MASS CONCENTRATION MEASUREMENT OF $PM_{2.5}$ FOR IDEALIZED FINE AEROSOL SIZE DISTRIBUTION

| Particle Aerodynamic Diameter (μm) | Test Sampler | | | Ideal Sampler | | |
|---|---|---|---|---|---|---|
| | Fractional Sampling Effectiveness | Interval Mass Concentration (μg/m³) | Estimated Mass Concentration Measurement (μg/m³) | Fractional Sampling Effectiveness | Interval Mass Concentration (μg/m³) | Estimated Mass Concentration Measurement (μg/m³) |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| <0.500 | 1.000 | 18.868 | | 1.000 | 18.868 | 18.868 |
| 0.625 | | 13.412 | | 0.999 | 13.412 | 13.399 |
| 0.750 | | 8.014 | | 0.998 | 8.014 | 7.998 |
| 0.875 | | 6.984 | | 0.997 | 6.984 | 6.963 |
| 1.000 | | 5.954 | | 0.995 | 5.954 | 5.924 |
| 1.125 | | 5.015 | | 0.991 | 5.015 | 4.970 |
| 1.250 | | 4.197 | | 0.987 | 4.197 | 4.142 |
| 1.375 | | 3.503 | | 0.980 | 3.503 | 3.433 |
| 1.500 | | 2.921 | | 0.969 | 2.921 | 2.830 |
| 1.675 | | 2.438 | | 0.954 | 2.438 | 2.326 |
| 1.750 | | 2.039 | | 0.932 | 2.039 | 1.900 |
| 1.875 | | 1.709 | | 0.899 | 1.709 | 1.536 |
| 2.000 | | 1.437 | | 0.854 | 1.437 | 1.227 |
| 2.125 | | 1.212 | | 0.791 | 1.212 | 0.959 |
| 2.250 | | 1.026 | | 0.707 | 1.026 | 0.725 |
| 2.375 | | 0.873 | | 0.602 | 0.873 | 0.526 |
| 2.500 | | 0.745 | | 0.480 | 0.745 | 0.358 |
| 2.625 | | 0.638 | | 0.351 | 0.638 | 0.224 |
| 2.750 | | 0.550 | | 0.230 | 0.550 | 0.127 |
| 2.875 | | 0.476 | | 0.133 | 0.476 | 0.063 |
| 3.000 | | 0.414 | | 0.067 | 0.414 | 0.028 |
| 3.125 | | 0.362 | | 0.030 | 0.362 | 0.011 |
| 3.250 | | 0.319 | | 0.012 | 0.319 | 0.004 |
| 3.375 | | 0.282 | | 0.004 | 0.282 | 0.001 |
| 3.500 | | 0.252 | | 0.001 | 0.252 | 0.000000 |
| 3.625 | | 0.226 | | 0.000000 | 0.226 | 0.000000 |
| 3.750 | | 0.204 | | 0.000000 | 0.204 | 0.000000 |
| 3.875 | | 0.185 | | 0.000000 | 0.185 | 0.000000 |
| 4.000 | | 0.170 | | 0.000000 | 0.170 | 0.000000 |
| 4.125 | | 0.157 | | 0.000000 | 0.157 | 0.000000 |
| 4.250 | | 0.146 | | 0.000000 | 0.146 | 0.000000 |
| 4.375 | | 0.136 | | 0.000000 | 0.136 | 0.000000 |
| 4.500 | | 0.129 | | 0.000000 | 0.129 | 0.000000 |
| 4.625 | | 0.122 | | 0.000000 | 0.122 | 0.000000 |
| 4.750 | | 0.117 | | 0.000000 | 0.117 | 0.000000 |
| 4.875 | | 0.112 | | 0.000000 | 0.112 | 0.000000 |
| 5.000 | | 0.108 | | 0.000000 | 0.108 | 0.000000 |
| 5.125 | | 0.105 | | 0.000000 | 0.105 | 0.000000 |

| Particle Aerodynamic Diameter (μm) | Test Sampler | | | Ideal Sampler | | |
|---|---|---|---|---|---|---|
| | Fractional Sampling Effectiveness | Interval Mass Concentration (μg/m³) | Estimated Mass Concentration Measurement (μg/m³) | Fractional Sampling Effectiveness | Interval Mass Concentration (μg/m³) | Estimated Mass Concentration Measurement (μg/m³) |
| 5.250 | | 0.102 | | 0.000000 | 0.102 | 0.000000 |
| 5.375 | | 0.100 | | 0.000000 | 0.100 | 0.000000 |
| 5.500 | | 0.098 | | 0.000000 | 0.098 | 0.000000 |
| 5.625 | | 0.097 | | 0.000000 | 0.097 | 0.000000 |
| 5.75 | | 0.096 | | 0.000000 | 0.096 | 0.000000 |
| | | $C_{sam(exp)}$= | | | $C_{ideal(exp)}$= | 78.539 |

FIGURE F–1 TO SUBPART F OF PART 53—DESIGNATION TESTING CHECKLIST

**DESIGNATION TESTING CHECKLIST FOR CLASS II**

Auditee _____ Auditor signature _____ Date _____

Compliance Status: Y = Yes N = No NA = Not applicable/Not available

| Verification | | | Verified by Direct Observation of Process or of Documented Evidence: Performance, Design or Application Spec. Corresponding to Sections of 40 CFR Part 53, Subparts E and F | Verification Comments (Includes documentation of who, what, where, when, why) (Doc. #, Rev. #, Rev. Date) |
|---|---|---|---|---|
| Y | N | NA | | |
| | | | **Subpart E: Performance Specification Tests** | |
| | | | Evaluation completed according to Subpart E § 53.50 to § 53.56 | |
| | | | **Subpart E: Class I Sequential Tests** | |
| | | | Class II samplers that are also Class I (sequentialized) have passed the tests in § 53.57 | |
| | | | **Subpart F: Performance Spec/Test** | |
| | | | Evaluation of Physical Characteristics of Clean Sampler - One of these tests must be performed:<br>§ 53.62 - Full Wind Tunnel<br>§ 53.63 - Inlet Aspiration<br>§ 53.64 - Static Fractionator | |
| | | | Evaluation of Physical Characteristics of Loaded Sampler<br>§ 53.65 Loading Test<br>One of the following tests must be performed for evaluation after loading: § 53.62, § 53.63, § 53.64 | |
| | | | Evaluation of the Volatile Characteristics of the Class II Sampler § 53.66 | |

## APPENDIX A TO SUBPART F OF PART 53—REFERENCES

(1) Marple, V.A., K.L. Rubow, W. Turner, and J.D. Spangler, Low Flow Rate Sharp Cut Impactors for Indoor Air Sampling: Design and Calibration., JAPCA, 37: 1303-1307 (1987).

(2) Vanderpool, R.W. and K.L. Rubow, Generation of Large, Solid Calibration Aerosols, J. of Aer. Sci. and Tech., 9:65-69 (1988).

(3) Society of Automotive Engineers Aerospace Material Specification (SAE AMS) 2404C, Electroless Nickel Planting, SAE, 400 Commonwealth Drive, Warrendale PA-15096, Revised 7-1-84, pp. 1-6.

# PART 54—PRIOR NOTICE OF CITIZEN SUITS

Sec.
54.1 Purpose.
54.2 Service of notice.
54.3 Contents of notice.

AUTHORITY: Sec. 304 of the Clean Air Act, as amended (sec. 12, Pub. L. 91–604, 84 Stat. 1706).

SOURCE: 36 FR 23386, Dec. 9, 1971, unless otherwise noted.

## § 54.1 Purpose.

Section 304 of the Clean Air Act, as amended, authorizes the commencement of civil actions to enforce the Act or to enforce certain requirements promulgated pursuant to the Act. The purpose of this part is to prescribe procedures governing the giving of notices required by subsection 304(b) of the Act (sec. 12, Pub. L. 91–604; 84 Stat. 1706) as a prerequisite to the commencement of such actions.

## § 54.2 Service of notice.

(a) Notice to Administrator: Service of notice given to the Administrator under this part shall be accomplished by certified mail addressed to the Administrator, Environmental Protection Agency, Washington, DC 20460. Where notice relates to violation of an emission standard or limitation or to violation of an order issued with respect to an emission standard or limitation, a copy of such notice shall be mailed to the Regional Administrator of the Environmental Protection Agency for the Region in which such violation is alleged to have occurred.

(b) Notice to State: Service of notice given to a State under this part regarding violation of an emission standard or limitation, or an order issued with respect to an emission standard or limitation shall be accomplished by certified mail addressed to an authorized representative of the State agency charged with responsibility for air pollution control in the State. A copy of such notice shall be mailed to the Governor of the State.

(c) Notice to alleged violator: Service of notice given to an alleged violator under this part shall be accomplished by certified mail addressed to, or by personal service upon, the owner or managing agent of the building, plant, installation, or facility alleged to be in violation of an emission standard or limitation, or an order issued with respect to an emission standard or limitation. Where the alleged violator is a corporation, a copy of such notice shall be sent by certified mail to the registered agent, if any, of such corporation in the State in which such violation is alleged to have occurred.

(d) Notice served in accordance with the provisions of this part shall be deemed given on the postmark date, if served by mail, or on the date of receipt, if personally served.

## § 54.3 Contents of notice.

(a) *Failure to act.* Notice regarding a failure of the Administrator to perform an act or duty which is not discretionary shall identify the provisions of the Act which requires such act or creates such duty, shall describe with reasonable specificity the action taken or not taken by the Administrator which is claimed to constitute a failure to perform such act or duty, and shall state the full name and address of the person giving the notice.

(b) *Violation of standard, limitation or order.* Notices to the Administrator, States, and alleged violators regarding violation of an emission standard or limitation or an order issued with respect to an emission standard or limitation, shall include sufficient information to permit the recipient to identify the specific standard, limitation, or order which has allegedly been violated, the activity alleged to be in violation, the person or persons responsible for the alleged violation, the location of the alleged violation, the date or dates of such violation, and the full name and address of the person giving the notice.

# PART 55—OUTER CONTINENTAL SHELF AIR REGULATIONS

Sec.
55.1 Statutory authority and scope.
55.2 Definitions.
55.3 Applicability.
55.4 Requirements to submit a notice of intent.
55.5 Corresponding onshore area designation.
55.6 Permit requirements.

55.7 Exemptions.
55.8 Monitoring, reporting, inspections, and compliance.
55.9 Enforcement.
55.10 Fees.
55.11 Delegation.
55.12 Consistency updates.
55.13 Federal requirements that apply to OCS sources.
55.14 Requirements that apply to OCS sources located within 25 miles of States' seaward boundaries, by State.
55.15 Specific designation of corresponding onshore areas.

APPENDIX A TO PART 55—LISTING OF STATE AND LOCAL REQUIREMENTS INCORPORATED BY REFERENCE INTO PART 55, BY STATE

AUTHORITY: Section 328 of the Clean Air Act (42 U.S.C. 7401, *et seq.*) as amended by Public Law 101–549.

SOURCE: 57 FR 40806, Sept. 4, 1992, unless otherwise noted.

### § 55.1 Statutory authority and scope.

Section 328(a)(1) of the Clean Air Act (''the Act''), requires the Environmental Protection Agency (''EPA'') to establish requirements to control air pollution from outer continental shelf (''OCS'') sources in order to attain and maintain Federal and State ambient air quality standards and to comply with the provisions of part C of title I of the Act. This part establishes the air pollution control requirements for OCS sources and the procedures for implementation and enforcement of the requirements, consistent with these stated objectives of section 328(a)(1) of the Act. In implementing, enforcing and revising this rule and in delegating authority hereunder, the Administrator will ensure that there is a rational relationship to the attainment and maintenance of Federal and State ambient air quality standards and the requirements of part C of title I, and that the rule is not used for the purpose of preventing exploration and development of the OCS.

### § 55.2 Definitions.

*Administrator* means the Administrator of the U.S. Environmental Protection Agency.

*Corresponding Onshore Area (COA)* means, with respect to any existing or proposed OCS source located within 25 miles of a State's seaward boundary, the onshore area that is geographically closest to the source or another onshore area that the Administrator designates as the COA, pursuant to § 55.5 of this part.

*Delegated agency* means any agency that has been delegated authority to implement and enforce requirements of this part by the Administrator, pursuant to § 55.11 of this part. It can refer to a State agency, a local agency, or an Indian tribe, depending on the delegation status of the program.

*Existing source or existing OCS source* shall have the meaning given in the applicable requirements incorporated into §§ 55.13 and 55.14 of this part, except that for two years following the date of promulgation of this part the definition given in § 55.3 of this part shall apply for the purpose of determining the required date of compliance with this part.

*Exploratory source or exploratory OCS source* means any OCS source that is a temporary operation conducted for the sole purpose of gathering information. This includes an operation conducted during the exploratory phase to determine the characteristics of the reservoir and formation and may involve the extraction of oil and gas.

*Modification* shall have the meaning given in the applicable requirements incorporated into §§ 55.13 and 55.14 of this part, except that for two years following the date of promulgation of this part the definition given in section 111(a) of the Act shall apply for the purpose of determining the required date of compliance with this part, as set forth in § 55.3 of this part.

*Nearest Onshore Area (NOA)* means, with respect to any existing or proposed OCS source, the onshore area that is geographically closest to that source.

*New source or new OCS source* shall have the meaning given in the applicable requirements of §§ 55.13 and 55.14 of this part, except that for two years following the date of promulgation of this part, the definition given in § 55.3 of this part shall apply for the purpose of determining the required date of compliance with this part.

*OCS source* means any equipment, activity, or facility which:

(1) Emits or has the potential to emit any air pollutant;

(2) Is regulated or authorized under the Outer Continental Shelf Lands Act (''OCSLA'') (43 U.S.C. §1331 *et seq.*); and

(3) Is located on the OCS or in or on waters above the OCS.

This definition shall include vessels only when they are:

(1) Permanently or temporarily attached to the seabed and erected thereon and used for the purpose of exploring, developing or producing resources therefrom, within the meaning of section 4(a)(1) of OCSLA (43 U.S.C. §1331 *et seq.*); or

(2) Physically attached to an OCS facility, in which case only the stationary sources aspects of the vessels will be regulated.

*Onshore area* means a coastal area designated as an attainment, nonattainment, or unclassifiable area by EPA in accordance with section 107 of the Act. If the boundaries of an area designated pursuant to section 107 of the Act do not coincide with the boundaries of a single onshore air pollution control agency, then onshore area shall mean a coastal area defined by the jurisdictional boundaries of an air pollution control agency.

*Outer continental shelf* shall have the meaning provided by section 2 of the OCSLA (43 U.S.C. §1331 *et seq.*).

*Potential emissions* means the maximum emissions of a pollutant from an OCS source operating at its design capacity. Any physical or operational limitation on the capacity of a source to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as a limit on the design capacity of the source if the limitation is federally enforceable. Pursuant to section 328 of the Act, emissions from vessels servicing or associated with an OCS source shall be considered direct emissions from such a source while at the source, and while enroute to or from the source when within 25 miles of the source, and shall be included in the ''potential to emit'' for an OCS source. This definition does not alter or affect the use of this term for any other purposes under §§55.13 or 55.14 of this part, except that vessel emissions must be included in the ''potential to emit'' as used in §§55.13 and 55.14 of this part.

*Residual emissions* means the difference in emissions from an OCS source if it applies the control requirements(s) imposed pursuant to §55.13 or §55,14 of this part and emissions from that source if it applies a substitute control requirement pursuant to an exemption granted under §55.7 of this part.

*State* means the State air pollution control agency that would be the permitting authority, a local air pollution permitting agency, or certain Indian tribes which can be the permitting authority for areas within their jurisdiction. State may also be used in the geographic sense to refer to a State, the NOA, or the COA.

[57 FR 40806, Sept. 4, 1992, as amended at 62 FR 46408, Sept. 2, 1997]

### §55.3 Applicability.

(a) This part applies to all OCS sources except those located in the Gulf of Mexico west of 87.5 degrees longitude.

(b) OCS sources located within 25 miles of States' seaward boundaries shall be subject to all the requirements of this part, which include, but are not limited to, the Federal requirements as set forth in §55.13 of this part and the Federal, State, and local requirements of the COA (designated pursuant to §55.5 of this part), as set forth in §55.14 of this part.

(c) The OCS sources located beyond 25 miles of States' seaward boundaries shall be subject to all the requirements of this part, except the requirements of §§55.4, 55.5, 55.12 and 55.14 of this part.

(d) New OCS sources shall comply with the requirements of this part by September 4, 1992 where a ''new OCS source'' means an OCS source that is a new source within the meaning of section 111(a) of the Act.

(e) Existing sources shall comply with the requirements of this part by September 4, 1994, where an ''existing OCS source'' means any source that is not a new source within the meaning of section 111(a) of the Act.

[57 FR 40806, Sept. 4, 1992, as amended at 62 FR 46408, Sept. 2, 1997]

**§ 55.4 Requirements to submit a notice of intent.**

(a) Prior to performing any physical change or change in method of operation that results in an increase in emissions, and not more than 18 months prior to submitting an application for a preconstruction permit, the applicant shall submit a Notice of Intent (''NOI'') to the Administrator through the EPA Regional Office, and at the same time shall submit copies of the NOI to the air pollution control agencies of the NOA and onshore areas adjacent to the NOA. This section applies only to sources located within 25 miles of States' seaward boundaries.

(b) The NOI shall include the following:

(1) General company information, including company name and address, owner's name and agent, and facility site contact.

(2) Facility description in terms of the proposed process and products, including identification by Standard Industrial Classification Code.

(3) Estimate of the proposed project's potential emissions of any air pollutant, expressed in total tons per year and in such other terms as may be necessary to determine the applicability of requirements of this part. Potential emissions for the project must include all vessel emissions associated with the proposed project in accordance with the definition of potential emissions in § 55.2 of this part.

(4) Description of all emissions points including associated vessels.

(5) Estimate of quantity and type of fuels and raw materials to be used.

(6) Description of proposed air pollution control equipment.

(7) Proposed limitations on source operations or any work practice standards affecting emissions.

(8) Other information affecting emissions, including, where applicable, information related to stack parameters (including height, diameter, and plume temperature), flow rates, and equipment and facility dimensions.

(9) Such other information as may be necessary to determine the applicability of onshore requirements.

(10) Such other information as may be necessary to determine the source's impact in onshore areas.

(c) Exploratory sources and modifications to existing sources with designated COAs shall be exempt from the requirement in paragraph (b)(10) of this section.

(d) The scope and contents of the NOI shall in no way limit the scope and contents of the required permit application or applicable requirements given in this part.

**§ 55.5 Corresponding onshore area designation.**

(a) *Proposed exploratory sources.* The NOA shall be the COA for exploratory sources located within 25 miles of States' seaward boundaries. Paragraphs (b), (c), and (f) of this section are not applicable to these sources.

(b) *Requests for designation.* (1) The chief executive officer of the air pollution control agency of an area that believes it has more stringent air pollution control requirements than the NOA for a proposed OCS source, may submit a request to be designated as the COA to the Administrator and at the same time shall send copies of the request to the chief executive officer of the NOA and to the proposed source. The request must be received by the Administrator within 60 days of the receipt of the NOI. If no requests are received by the Administrator within 60 days of the receipt of the NOI, the NOA will become the designated COA without further action.

(2) No later than 90 days after the receipt of the NOI, a demonstration must be received by the Administrator showing that:

(i) The area has more stringent requirements with respect to the control and abatement of air pollution than the NOA;

(ii) The emissions from the source are or would be transported to the requesting area; and

(iii) The transported emissions would affect the requesting area's efforts to attain or maintain a Federal or State ambient air quality standard or to comply with the requirements of part C of title I of the Act, taking into account the effect of air pollution control requirements that would be imposed if the NOA were designated as the COA.

(c) *Determination by the Administrator.* (1) If no demonstrations are received by

the Administrator within 90 days of the receipt of the NOI, the NOA will become the designated COA without further action.

(2) If one or more demonstrations are received, the Administrator will issue a preliminary designation of the COA within 150 days of the receipt of the NOI, which shall be followed by a 30 day public comment period, in accordance with paragraph (f) of this section.

(3) The Administrator will designate the COA for a specific source within 240 days of the receipt of the NOI.

(4) When the Administrator designates a more stringent area as the COA with respect to a specific OCS source, the delegated agency in the COA will exercise all delegated authority. If there is no delegated agency in the COA, then EPA will issue the permit and implement and enforce the requirements of this part. The Administrator may retain authority for implementing and enforcing the requirements of this part if the NOA and the COA are in different States.

(5) The Administrator shall designate the COA for each source only once in the source's lifetime.

(d) *Offset requirements*. Offsets shall be obtained based on the applicable requirements of the COA, as set forth in §§55.13 and 55.14 of this part.

(e) *Authority to designate the COA*. The authority to designate the COA for any OCS source shall not be delegated to a State or local agency, but shall be retained by the Administrator.

(f) *Administrative procedures and public participation*. The Administrator will use the following public notice and comment procedures for processing a request for COA designation under this section:

(1) Within 150 days from receipt of an NOI, if one or more demonstrations are received, the Administrator shall make a preliminary determination of the COA and shall:

(i) Make available, in at least one location in the NOA and in the area requesting COA designation, a copy of all materials submitted by the requester, a copy of the Administrator's preliminary determination, and a copy or summary of other materials, if any, considered by the Administrator in making the preliminary determination; and

(ii) Notify the public, by prominent advertisement in a newspaper of general circulation in the NOA and the area requesting COA designation, of a 30-day opportunity for written public comment on the available information and the Administrator's preliminary COA designation.

(2) A copy of the notice required pursuant to paragraph (f)(1)(ii) of this section shall be sent to the requester, the affected source, each person from whom a written request of such notice has been received, and the following officials and agencies having jurisdiction over the COA and NOA: State and local air pollution control agencies, the chief executive of the city and county, the Federal Land Manager of potentially affected Class I areas, and any Indian governing body whose lands may be affected by emissions from the OCS source.

(3) Public comments received in writing within 30 days after the date the public notice is made available will be considered by the Administrator in making the final decision on the request. All comments will be made available for public inspection.

(4) The Administrator will make a final COA designation within 60 days after the close of the public comment period. The Administrator will notify, in writing, the requester and each person who has requested notice of the final action and will set forth the reasons for the determination. Such notification will be made available for public inspection.

[57 FR 40806, Sept. 4, 1992, as amended at 61 FR 25151, May 20, 1996]

### §55.6 Permit requirements.

(a) *General provisions*—(1) *Permit applications*. (i) The owner or operator of an OCS source shall submit to the Administrator or delegated agency all information necessary to perform any analysis or make any determination required under this section.

(ii) Any application submitted pursuant to this part by an OCS source shall include a description of all the requirements of this part and a description of how the source will comply with the

applicable requirements. For identification purposes only, the application shall include a description of those requirements that have been proposed by EPA for incorporation into this part and that the applicant believes, after diligent research and inquiry, apply to the source.

(2) *Exemptions*. (i) When an applicant submits any approval to construct or permit to operate application to the Administrator or delegated agency it shall include a request for exemption from compliance with any pollution control technology requirement that the applicant believes is technically infeasible or will cause an unreasonable threat to health and safety. The Administrator or delegated agency shall act on the request for exemption in accordance with the procedures established in § 55.7 of this part.

(ii) A final permit shall not be issued under this part until a final determination is made on any exemption request, including those appealed to the Administrator in accordance with § 55.7 of this part.

(3) *Administrative procedures and public participation*. The Administrator will follow the applicable procedures of 40 CFR part 124 in processing applications under this part. Until 40 CFR part 124 has been modified to specifically reference permits issued under this part, the Administrator will follow the procedures in part 124 used to issue Prevention of Significant Deterioration (''PSD'') permits.

(4) *Source obligation*. (i) Any owner or operator who constructs or operates an OCS source not in accordance with the application submitted pursuant to this part 55, or with any approval to construct or permit to operate, or any owner or operator of a source subject to the requirements of this part who commences construction after the effective date of this part without applying for and receiving approval under this part, shall be in violation of this part.

(ii) Any owner or operator of a new OCS source who commenced construction prior to the promulgation date of this rule shall comply with the requirements of paragraph (e) of this section.

(iii) Receipt of an approval to construct or a permit to operate from the Administrator or delegated agency shall not relieve any owner or operator of the responsibility to comply fully with the applicable provisions of any other requirements under Federal law.

(iv) The owner or operator of an OCS source to whom the approval to construct or permit to operate is issued under this part shall notify all other owners and operators, contractors, and the subsequent owners and operators associated with emissions from the source, of the conditions of the permit issued under this part.

(5) *Delegation of authority*. If the Administrator delegates any of the authority to implement and enforce the requirements of this section, the following provisions shall apply:

(i) The applicant shall send a copy of any permit application required by this section to the Administrator through the EPA Regional Office at the same time as the application is submitted to the delegated agency.

(ii) The delegated agency shall send a copy of any public comment notice required under this section or §§ 55.13 or 55.14 to the Administrator through the EPA Regional Office.

(iii) The delegated agency shall send a copy of any preliminary determination and final permit action required under this section or §§ 55.13 or 55.14 to the Administrator through the EPA Regional Office at the time of the determination and shall make available to the Administrator any materials used in making the determination.

(b) *Preconstruction requirements for OCS sources located within 25 miles of States' seaward boundaries*. (1) No OCS source to which the requirements of §§ 55.13 or 55.14 of this part apply shall begin actual construction after the effective date of this part without a permit that requires the OCS source to meet those requirements.

(2) Any permit application required under this part shall not be submitted until the Administrator has determined whether a consistency update is necessary, pursuant to § 55.12 of this part, and, if the Administrator finds an update to be necessary, has published a proposed consistency update.

(3) The applicant may be required to obtain more than one preconstruction

permit, if necessitated by partial delegation of this part or by the requirements of this section and §§55.13 and 55.14 of this part.

(4) An approval to construct shall become invalid if construction is not commenced within 18 months after receipt of such approval, if construction is discontinued for a period of 18 months or more, or if construction is not completed within a reasonable time. The 18-month period may be extended upon a showing satisfactory to the Administrator or the delegated agency that an extension is justified. Sources obtaining extensions are subject to all new or interim requirements and a reassessment of the applicable control technology when the extension is granted. This requirement shall not supersede a more stringent requirement under §§55.13 or 55.14 of this part.

(5) Any preconstruction permit issued to a new OCS source or modification shall remain in effect until it expires under paragraph (b)(4) of this section or is rescinded under the applicable requirements incorporated in §§55.13 and 55.14 of this part.

(6) Whenever any proposed OCS source or modification to an existing OCS source is subject to action by a Federal agency that might necessitate preparation of an environmental impact statement pursuant to the National Environmental Policy Act (42 U.S.C. 4321), review by the Administrator conducted pursuant to this section shall be coordinated with the environmental reviews under that Act to the extent feasible and reasonable.

(7) The Administrator or delegated agency and the applicant shall provide written notice of any permit application from a source, the emissions from which may affect a Class I area, to the Federal Land Manager charged with direct responsibility for management of any lands within the Class I area. Such notification shall include a copy of all information contained in the permit application and shall be given within 30 days of receipt of the application and at least 60 days prior to any public hearing on the preconstruction permit.

(8) *Modification of existing sources.* The preconstruction requirements above shall not apply to a particular modification, as defined in §55.13 or §55.14 of this part, of an existing OCS source if:

(i) The modification is necessary to comply with this part, and no other physical change or change in the method of operation is made in conjunction with the modification;

(ii) The modification is made within 24 months of promulgation of this part; and

(iii) The modification does not result in an increase, in excess of any *de minimus* levels contained in the applicable requirements of §§55.13 and 55.14, of potential emissions or actual hourly emissions of a pollutant regulated under the Act.

(9) *Compliance plans.* Sources intending to perform modifications that meet all of the criteria of paragraph (b)(8) of this section shall submit a compliance plan to the Administrator or delegated agency prior to performing the modification. The compliance shall describe the schedule and method the source will use to comply with the applicable OCS requirements within 24 months of the promulgation date of this part and shall include a request for any exemptions from compliance with a pollution control technology requirement that the applicant believes is technically infeasible or will cause an unreasonable threat to health and safety. The Administrator or delegated agency shall act on the request for exemption in accordance with the procedures established in §55.7 of this part.

(i) The Administrator or delegated agency shall review the compliance plan and provide written comments to the source within 45 days of receipt of such plan. The source shall provide a written response to such comments as required by the reviewing agency.

(ii) Receipt and review of a compliance plan by the Administrator or delegated agency shall not relieve any owner or operator of an existing OCS source of the responsibility to comply fully with the applicable requirements of §§55.13 and 55.14 of this part within 24 months of promulgation of this part.

(c) *Operating permit requirements for sources located within 25 miles of States' seaward boundaries.* (1) All applicable operating permit requirements listed in this section and incorporated into

§§ 55.13 and 55.14 of this part shall apply to OCS sources.

(2) The Administrator or delegated agency shall not issue a permit to operate to any existing OCS source that has not demonstrated compliance with all the applicable requirements of this part.

(3) If the COA does not have an operating permits program approved pursuant to 40 CFR part 70 or if EPA has determined that the COA is not adequately implementing an approved program, the applicable requirements of 40 CFR part 71, the Federal operating permits program, shall apply to the OCS sources. The applicable requirements of 40 CFR part 71 will be implemented and enforced by the Administrator. The Administrator may delegate the authority to implement and enforce all or part of a Federal operating permits program to a State pursuant to § 55.11 of this part.

(d) *Permit requirements for sources located beyond 25 miles of States' seaward boundaries.* (1) OCS sources located beyond 25 miles of States' seaward boundaries shall be subject to the permitting requirements set forth in this section and § 55.13 of this part.

(2) The Administrator or delegated agency shall not issue a permit-to-operate to any existing OCS source that has not demonstrated compliance with all the applicable requirements of this part.

(e) *Permit requirements for new sources that commenced construction prior to September 4, 1992*—(1) *Applicability.* § 55.6(e) applies to a new OCS source, as defined by section 328 of the Act, that commenced construction before September 4, 1992.

(2) A source subject to § 55.6(e) shall comply with the following requirements:

(i) By October 5, 1992, the owner or operator of the source shall submit a transitional permit application (''TPA'') to the Administrator or the delegated agency. The TPA shall include the following:

(A) The information specified in §§ 55.4(b)(1) through § 55.4(b)(9) of this part;

(B) A list of all requirements applicable to the source under this part;

(C) A request for exemption from compliance with any control technology requirement that the applicant believes is technically infeasible or will cause an unreasonable threat to health and safety;

(D) An air quality screening analysis demonstrating whether the source has or is expected in the future to cause or contribute to a violation of any applicable State or Federal ambient air quality standard or exceed any applicable increment. If no air quality analysis is required by the applicable requirements of §§ 55.13 and 55.14, this requirement does not apply;

(E) Documentation that source emissions are currently being offset, or will be offset if the source has not commenced operation, at the ratio required under this part, and documentation that those offsets meet or will meet the requirements of this part; and

(F) A description of how the source is complying with the applicable requirements of §§ 55.13 and 55.14 of this part, including emission levels and corresponding control measures, including Best Available Control Technology (''BACT'') or Lowest Achievable Emission Rates (''LAER''), but excluding the requirements to have valid permits.

(ii) The source shall expeditiously complete its permit application in compliance with the schedule determined by the Administrator or delegated agency.

(iii) The source shall comply with all applicable requirements of this part except for the requirements of paragraph (a)(4)(i) of this section. The source shall comply with the control technology requirements (such as BACT or LAER) set forth in the TPA that would be applicable if the source had a valid permit.

(iv) Any owner or operator subject to this subsection who continues to construct or operate an OCS source thirty days from promulgation of this part without submitting a TPA, or continues to construct or operate an OCS source not in accordance with the TPA submitted pursuant to paragraph (e) of this section, or constructs or operates an OCS source not in accordance with

the schedule determined by the permitting authority, shall be in violation of this part.

(3) Upon the submittal of a permit application deemed to be complete by the permitting authority, the owner or operator of the source shall be subject to the permitting requirements of §§55.13 and 55.14 of this part that apply subsequent to the submission of a complete permit application. When a source receives the permit or permits required under this part, its TPA shall expire.

(4) Until the date that a source subject to this subsection receives the permit or permits required under this part, that source shall cease operation if, based on projected or actual emissions, the permitting authority determines that the source is currently or may in the future cause or contribute to a violation of a State or Federal ambient air quality standard or exceed any applicable increment.

[57 FR 40806, Sept. 4, 1992, as amended at 61 FR 34228, July 1, 1996; 62 FR 46409, Sept. 2, 1997]

### §55.7 Exemptions.

(a) *Authority and criteria.* The Administrator or the delegated agency may exempt a source from a control technology requirement of this part if the Administrator or the delegated agency finds that compliance with the control technology requirement is technically infeasible or will cause an unreasonable threat to health and safety.

(b) *Request for an exemption*—(1) *Permit application required.* An applicant shall submit a request for an exemption from a control technology requirement at the same time as the applicant submits a preconstruction or operating permit application to the Administrator or delegated agency.

(2) *No permit application required.* If no permit or permit modification is required, a request for an exemption must be received by the Administrator or delegated agency within 60 days from the date the control technology requirement is promulgated by EPA.

(3) *Compliance plan.* An existing source that submits a compliance plan in accordance with §55.6(b) of this part shall submit all requests for exemptions at the same time as the compliance plan. For the purpose of applying §55.7 of this part, a request submitted with a compliance plan shall be treated in the same manner as a request that does not require a permit application.

(4) *Content of request.* (i) The request shall include information that demonstrates that compliance with a control technology requirement of this part would be technically infeasible or would cause an unreasonable threat to health and safety.

(ii) The request shall include a proposed substitute requirement(s) as close in stringency to the original requirement as possible.

(iii) The request shall include an estimate of emission reductions that would be achieved by compliance with the original requirement, an estimate of emission reductions that would be achieved by compliance with the proposed substitute requirement(s) and an estimate of residual emissions.

(iv) The request shall identify emission reductions of a sufficient quantity to offset the estimated residual emissions. Sources located beyond 25 miles from States' seaward boundaries shall consult with the Administrator to identify suitable emission reductions.

(c) *Consultation requirement.* If the authority to grant or deny exemptions has been delegated, the delegated agency shall consult with the Minerals Management Service of the U.S. Department of Interior and the U.S. Coast Guard to determine whether the exemption will be granted or denied.

(1) The delegated agency shall transmit to the Administrator (through the Regional Office), the Minerals Management Service, and the U.S. Coast Guard, a copy of the permit application, or the request if no permit is required, within 5 days of its receipt.

(2) *Consensus.* If the delegated agency, the Minerals Management Service, and the U.S. Coast Guard reach a consensus decision on the request within 90 days from the date the delegated agency received the request, the delegated agency may issue a preliminary determination in accordance with the applicable requirements of paragraph (f) of this section.

(3) *No consensus.* If the delegated agency, the Minerals Management Service, and the U.S. Coast Guard do

not reach a consensus decision within 90 days from the date the delegated agency received the request, the request shall automatically be referred to the Administrator who will process the referral in accordance with paragraph (f)(3) of this section. The delegated agency shall transmit to the Administrator, within 91 days of its receipt, the request and all materials submitted with the request, such as the permit application or the compliance plan, and any other information considered or developed during the consultation process.

(4) If a request is referred to the Administrator and the delegated agency issues a preliminary determination on a permit application before the Administrator issues a final decision on the exemption, the delegated agency shall include a notice of the opportunity to comment on the Administrator's preliminary determination in accordance with the procedures of paragraph (f)(4) of this section.

(5) The Administrator's final decision on a request that has been referred pursuant to paragraph (c) of this section shall be incorporated into the final permit issued by the delegated agency. If no permit is required, the Administrator's final decision on the request shall be implemented and enforced by the delegated agency.

(d) *Preliminary determination*. The Administrator or delegated agency shall issue a preliminary determination in accordance with paragraph (f) of this section. A preliminary determination shall propose to grant or deny the request for exemption. A preliminary determination to grant the request shall include proposed substitute control requirements and offsets necessary to comply with the requirements of paragraph (e) of this section.

(e) *Grant of exemption*. (1) The source shall comply with a substitute requirement(s), equal to or as close in stringency to the original requirement as possible, as determined by the Administrator or delegated agency.

(2) An OCS source located within 25 miles of States' seaward boundaries shall offset residual emissions resulting from the grant of an exemption request in accordance with the requirements of the Act and the regulations thereunder. The source shall obtain offsets in accordance with the applicable requirements as follows:

(i) If offsets are required in the COA, a new source shall offset residual emissions in the same manner as all other new source emissions in accordance with the requirements of § 55.5(d) of this part.

(ii) If offsets are not required in the COA, a new source shall comply with an offset ratio of 1:1.

(iii) An existing OCS source shall comply with an offset at a ratio of 1:1.

(3) An OCS source located beyond 25 miles from States' seaward boundaries shall obtain emission reductions at a ratio determined by the Administrator to be adequate to protect State and Federal ambient air quality standards and to comply with part C of title I of the Act.

(f) *Administrative procedures and public participation*—(1) *Request submitted with a permit application*. If a request is submitted with a permit application, the request shall be considered part of the permit application and shall be processed accordingly for the purpose of administrative procedures and public notice and comment requirements. The Administrator shall comply with the requirements of 40 CFR part 124 and the requirements set forth at § 55.6 of this part. If the Administrator has delegated authority to a State, the delegated agency shall use its own procedures as deemed adequate by the Administrator in accordance with § 55.11 of this part. These procedures must provide for public notice and comment on the preliminary determination.

(2) *Request submitted without a permit or with a compliance plan*. If a permit is not required, the Administrator or the delegated agency shall issue a preliminary determination within 90 days from the date the request was received, and shall use the procedures set forth at paragraph (f)(4) of this section for processing a request.

(3) *Referral*. If a request is referred to the Administrator pursuant to paragraph (c) of this section, the Administrator shall make a preliminary determination no later than 30 days after receipt of the request and any accompanying materials transmitted by the delegated agency. The Administrator

shall use the procedures set forth at paragraph (f)(4) of this section for processing a request.

(4) The Administrator or the delegated agency shall comply with the following requirements for processing requests submitted without a permit, with a compliance plan, and requests referred to the Administrator:

(i) Issue a preliminary determination to grant or deny the request. A preliminary determination by the Administrator to deny a request shall be considered a final decision and will be accompanied by the reasons for the decision. As such, it is not subject to any further public notice, comment, or hearings. Written notice of the denial shall be given to the requester.

(ii) Make available, in at least one location in the COA and NOA, a copy of all materials submitted by the requester, a copy of the preliminary determination, and a copy or summary of other materials, if any, considered in making the preliminary determination.

(iii) Notify the public, by prominent advertisement in a newspaper of general circulation in the COA and NOA, of a 30-day opportunity for written public comment on the information submitted by the owner or operator and on the preliminary determination.

(iv) Send a copy of the notice required pursuant to paragraph (f)(4)(iii) of this section to the requester, the affected source, each person from whom a written request of such notice has been received, and the following officials and agencies having jurisdiction over the COA and NOA: State and local air pollution control agencies, the chief executive of the city and county, the Federal Land Manager of potentially affected Class I areas, and any Indian governing body whose lands may be affected by emissions from the OCS source.

(v) Consider written public comments received within 30 days after the date the public notice is made available when making the final decision on the request. All comments will be made available for public inspection. At the time that any final decision is issued, the Administrator or delegated agency will issue a response to comments.

(vi) Make a final decision on the request within 30 days after the close of the public comment period. The Administrator or the delegated agency will notify, in writing, the applicant and each person who has submitted written comments, or from whom a written request of such notice has been received, of the final decision and will set forth the reasons. Such notification will be made available for public inspection.

(5) Within 30 days after the final decision has been made on a request, the requester, or any person who filed comments on the preliminary determination, may petition the Administrator to review any aspect of the decision. Any person who failed to file comments on the preliminary decision may petition for administrative review only on the changes from the preliminary to the final determination.

### § 55.8 Monitoring, reporting, inspections, and compliance.

(a) The Administrator may require monitoring or reporting and may authorize inspections pursuant to section 114 of the Act and the regulations thereunder. Sources shall also be subject to the requirements set forth in §§ 55.13 and 55.14 of this part.

(b) All monitoring, reporting, inspection and compliance requirements authorized under the Act shall apply.

(c) An existing OCS source that is not required to obtain a permit to operate within 24 months of the date of promulgation of this part shall submit a compliance report to the Administrator or delegated agency within 25 months of promulgation of this part. The compliance report shall specify all the applicable OCS requirements of this part and a description of how the source has complied with these requirements.

(d) The Administrator or the delegated agency shall consult with the Minerals Management Service and the U.S. Coast Guard prior to inspections. This shall in no way interfere with the ability of EPA or the delegated agency to conduct unannounced inspections.

(Approved by the Office of Management and Budget under control number 2060–0249)

[57 FR 40806, Sept. 4, 1992, as amended at 58 FR 16626, Mar. 30, 1993]

**§ 55.9 Enforcement.**

(a) OCS sources shall comply with all requirements of this part and all permits issued pursuant to this part. Failure to do so shall be considered a violation of section 111(e) of the Act.

(b) All enforcement provisions of the Act, including, but not limited to, the provisions of sections 113, 114, 120, 303 and 304 of the Act, shall apply to OCS sources.

(c) If a facility is ordered to cease operation of any piece of equipment due to enforcement action taken by EPA or a delegated agency pursuant to this part, the shutdown will be coordinated by the enforcing agency with the Minerals Management Service and the U.S. Coast Guard to assure that the shutdown will proceed in a safe manner. No shutdown action will occur until after consultation with these agencies, but in no case will initiation of the shutdown be delayed by more than 24 hours.

**§ 55.10 Fees.**

(a) *OCS sources located within 25 miles of States' seaward boundaries.* (1) The EPA will calculate and collect operating permit fees from OCS sources in accordance with the requirements of 40 CFR part 71.

(2) EPA will collect all other fees from OCS sources calculated in accordance with the fee requirements imposed in the COA if the fees are based on regulatory objectives, such as discouraging emissions. If the fee requirements are based on cost recovery objectives, however, EPA will adjust the fees to reflect the costs to EPA to issue permits and administer the permit program.

(3) Upon delegation, the delegated agency will collect fees from OCS sources calculated in accordance with the fee requirements imposed in the COA. Upon delegation of authority to implement and enforce any portion of this part, EPA will cease to collect fees imposed in conjunction with that portion.

(b) The OCS sources located beyond 25 miles of States' seaward boundaries. The EPA will calculate and collect operating permit fees from OCS sources in accordance with the requirements of 40 CFR part 71.

[57 FR 40806, Sept. 4, 1992, as amended at 61 FR 34228, July 1, 1996]

**§ 55.11 Delegation.**

(a) The Governor or the Governor's designee of any State adjacent to an OCS source subject to the requirements of this part may submit a request, purusant to section 328(a)(3) of the Act, to the Administrator for the authority to implement and enforce the requirements of this OCS program: Within 25 miles of the State's seaward boundary; and/or Beyond 25 miles of the State's seaward boundary. Authority to implement and enforce §§ 55.5, 55.11, and 55.12 of this part will not be delegated.

(b) The Administrator will delegate implementation and enforcement authority to a State if the State has an adjacent OCS source and the Administrator determines that the State's regulations are adequate, including a demonstration by the State that the State has:

(1) Adopted the appropriate portions of this part into State law;

(2) Adequate authority under State law to implement and enforce the requirements of this part. A letter from the State Attorney General shall be required stating that the requesting agency has such authority;

(3) Adequate resources to implement and enforce the requirements of this part; and

(4) Adequate administrative procedures to implement and enforce the requirements of this part, including public notice and comment procedures.

(c) The Administrator will notify in writing the Governor or the Governor's designee of the Administrator's final action on a request for delegation within 6 months of the receipt of the request.

(d) If the Administrator finds that the State regulations are adequate, the Administrator will authorize the State to implement and enforce the OCS requirements under State law. If the Administrator finds that only part of the State regulations are adequate, he will authorize the State to implement and enforce only that portion of this part.

(e) Upon delegation, a State may use any authority it possesses under State

law to enforce any permit condition or any other requirement of this part for which the agency has delegated authority under this part. A State may use any authority it possesses under State law to require monitoring and reporting and to conduct inspections.

(f) Nothing in this part shall prohibit the Administrator from enforcing any requirement of this part.

(g) The Administrator will withdraw a delegation of any authority to implement and enforce any or all of this part if the Administrator determines that: (1) The requirements of this part are not being adequately implemented or enforced by the delegated agency, or (2) The delegated agency no longer has adequate regulations as required by § 55.11(b) of this part.

(h) *Sharing of information*. Any information obtained or used in the administration of a delegated program shall be made available to EPA upon request without restriction. If the information has been submitted to the delegated agency under a claim of confidentiality, the delegated agency must notify the source of this obligation and submit that claim to EPA. Any information obtained from a delegated agency accompanied by a claim of confidentiality will be treated in accordance with the requirements of 40 CFR part 2.

(i) *Grant of exemptions*. A decision by a delegated agency to grant or deny an exemption request may be appealed to the Administrator in accordance with § 55.7 of this part.

(j) *Delegated authority*. The delegated agency in the COA for sources located within 25 miles of the State's seaward boundary or the delegated agency in the NOA for sources located beyond 25 miles of the State's seaward boundary will exercise all delegated authority. If there is no delegated agency in the COA for sources located within 25 miles of the State's seaward boundary, or in the NOA for sources located beyond 25 miles of the State's seaward boundary, the EPA will issue the permit and implement and enforce the requirements of this part. For sources located within 25 miles of the State's seaward boundary, the Administrator may retain the authority for implementing and enforcing the requirements of this part if the NOA and COA are in different States.

[57 FR 40806, Sept. 4, 1992, as amended at 62 FR 46409, Sept. 2, 1997]

### § 55.12 Consistency updates.

(a) The Administrator will update this part as necessary to maintain consistency with the regulations of onshore areas in order to attain and maintain Federal and State ambient standards and comply with part C of title I of the Act.

(b) Where an OCS activity is occurring within 25 miles of a State seaward boundary, consistency reviews will occur at least annually. In addition, in accordance with paragraphs (c) and (d) of this section, consistency reviews will occur upon receipt of an NOI and when a State or local agency submits a rule to EPA to be considered for incorporation by reference in this part 55.

(1) Upon initiation of a consistency review, the Administrator will evaluate the requirements of part 55 to determine whether they are consistent with the current onshore requirements.

(2) If the Administrator finds that part 55 is inconsistent with the requirements in effect in the onshore area, EPA will conduct a notice and comment rulemaking to update part 55 accordingly.

(c) *Consistency reviews triggered by receipt of an NOI*. Upon receipt of an NOI, the Administrator will initiate a consistency review of regulations in the onshore area.

(1) If the NOI is submitted by a source for which the COA has previously been assigned, EPA will publish a proposed consistency update in the FEDERAL REGISTER no later than 60 days after the receipt of the NOI, if an update is deemed necessary by the Administrator:

(2) If the NOI is submitted by a source requiring a COA designation, EPA will publish a proposed consistency update in the FEDERAL REGISTER, if an update is deemed necessary by the Administrator:

(i) No later than 75 days after receipt of the NOI if no adjacent areas submit a request for COA designation and the NOA becomes the COA by default, or

(ii) No later than 105 days after receipt of the NOI if an adjacent area

submits a request to be designated as COA but fails to submit the required demonstration within 90 days of receipt of the NOI, or

(iii) No later than 15 days after the date of the final COA determination if one or more demonstrations are received.

(d) *Consistency reviews triggered by State and local air pollution control agencies submitting rules directly to EPA for inclusion into part 55.* (1) EPA will propose in the FEDERAL REGISTER to approve applicable rules submitted by State or local regulatory agencies for incorporation by reference into § 55.14 of this part by the end of the calendar quarter following the quarter in which the submittal is received by EPA.

(2) State and local rules submitted for inclusion in part 55 must be rationally related to the attainment and maintenance of Federal or State ambient air quality standards or to the requirements of part C of title I of the Act. The submittal must be legible and unmarked, with the adoption date and the name of the agency on each page, and must be accompanied by proof of adoption.

(e) No rule or regulation that EPA finds to be arbitrary or capricious will be incorporated into this part.

(f) A source may not submit a complete permit application until any update the Administrator deems necessary to make part 55 consistent with the COA's rules has been proposed.

### § 55.13 Federal requirements that apply to OCS sources.

(a) The requirements of this section shall apply to OCS sources as set forth below. In the event that a requirement of this section conflicts with an applicable requirement of § 55.14 of this part and a source cannot comply with the requirements of both sections, the more stringent requirement shall apply.

(b) In applying the requirements incorporated into this section:

(1) *New Source* means new OCS source; and

(2) *Existing Source* means existing OCS source; and

(3) *Modification* means a modification to an OCS source.

(4) For requirements adopted prior to promulgation of this part, language in such requirements limiting the applicability of the requirements to onshore sources or to sources within State boundaries shall not apply.

(c) 40 CFR part 60 (NSPS) shall apply to OCS sources in the same manner as in the COA, except that any source determined to be an existing source pursuant to § 55.3(e) of this part shall not be considered a ''new source'' for the purpose of NSPS adopted before December 5, 1991.

(d) 40 CFR 52.21 (PSD) shall apply to OCS sources:

(1) Located within 25 miles of a State's seaward boundary if the requirements of 40 CFR 52.21 are in effect in the COA;

(2) Located beyond 25 miles of States' seaward boundaries.

(e) 40 CFR part 61, together with any other provisions promulgated pursuant to section 112 of the Act, shall apply if rationally related to the attainment and maintenance of Federal or State ambient air quality standards or the requirements of part C of title I of the Act.

(f) 40 CFR part 71 shall apply to OCS sources:

(1) Located within 25 miles of States' seaward boundaries if the requirements of 40 CFR part 71 are in effect in the COA.

(2) Located beyond 25 miles of States' seaward boundaries.

(3) When an operating permits program approved pursuant to 40 CFR part 70 is in effect in the COA and a Federal operating permit is issued to satisfy an EPA objection pursuant to 40 CFR 71.4(e).

(g) The provisions of 40 CFR 52.10, 40 CFR 52.24, and 40 CFR part 51 and accompanying appendix S shall apply to OCS sources located within 25 miles of States' seaward boundaries, if these requirements are in effect in the COA.

(h) If the Administrator determines that additional requirements are necessary to protect Federal and State ambient air quality standards or to comply with part C of title I, such requirements will be incorporated in this part.

[57 FR 40806, Sept. 4, 1992, as amended at 61 FR 34228, July 1, 1996]

**§55.14 Requirements that apply to OCS sources located within 25 miles of States' seaward boundaries, by State.**

(a) The requirements of this section shall apply to OCS sources as set forth below. In the event that a requirement of this section conflicts with an applicable requirement of §55.13 of this part and a source cannot comply with the requirements of both sections, the more stringent requirement shall apply.

(b) In applying the requirements incorporated into this section:

(1) *New Source* means new OCS source; and

(2) *Existing Source* means existing OCS source; and

(3) *Modification* means a modification to an existing OCS source.

(4) For requirements adopted prior to promulgation of this part, language in such requirements limiting the applicability of the requirements to onshore sources or to sources within State boundaries shall not apply.

(c) During periods of EPA implementation and enforcement of this section, the following shall apply:

(1) Any reference to a State or local air pollution control agency or air pollution control officer shall mean EPA or the Administrator, respectively.

(2) Any submittal to State or local air pollution control agency shall instead be submitted to the Administrator through the EPA Regional Office.

(3) Nothing in this section shall alter or limit EPA's authority to administer or enforce the requirements of this part under Federal law.

(4) EPA shall not be bound by any State or local administrative or procedural requirements including, but not limited to, requirements pertaining to hearing boards, permit issuance, public notice procedures, and public hearings. EPA will follow the applicable procedures set forth elsewhere in this part, in 40 CFR part 124, and in Federal rules promulgated pursuant to title V of the Act (as such rules apply in the COA), when administering this section.

(5) Only those requirements of 40 CFR part 52 that are rationally related to the attainment and maintenance of Federal or State ambient air quality standards or part C of title I shall apply to OCS sources.

(d) *Implementation Plan Requirements.*

(1) [Reserved]

(2) Alaska.

(i) 40 CFR part 52, subpart C.

(ii) [Reserved]

(3) California.

(i) 40 CFR part 52, subpart F.

(ii) [Reserved]

(4)–(5) [Reserved]

(6) Florida.

(i) 40 CFR part 52, subpart K.

(ii) [Reserved]

(7)–(16) [Reserved]

(17) North Carolina.

(i) 40 CFR part 52, subpart II.

(ii) [Reserved]

(18)–(23) [Reserved]

(e) *State and local requirements.* State and local requirements promulgated by EPA as applicable to OCS sources located within 25 miles of States' seaward boundaries have been compiled into separate documents organized by State and local areas of jurisdiction. These documents, set forth below, are incorporated by reference. This incorporation by reference was approved by the Director of the Federal Register Office in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be inspected at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030, or go to: *http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.* Copies of rules pertaining to particular States or local areas may be inspected or obtained from the EPA Air Docket (A–91–76), U.S. EPA, room M–1500, 401 M St., SW., Washington, DC 20460 or the appropriate EPA regional offices: U.S. EPA, Region 4 (Florida and North Carolina), 345 Courtland Street, NE., Atlanta, GA 30365; U.S. EPA, Region 9 (California), 75 Hawthorne Street, San Francisco, CA 94105; and U.S. EPA, Region 10 (Alaska), 1200 Sixth Avenue, Seattle, WA 98101. For an informational listing of the State and local requirements incorporated into this part, which are applicable to sources of air pollution located on the OCS, see appendix A to this part.

(1) [Reserved]

(2) Alaska.

(i) State requirements.

(A) State of Alaska Requirements Applicable to OCS Sources, December 3, 2005.

(B) [Reserved]

(ii) Local requirements.

(A) *South Central Alaska Clean Air Authority Requirements Applicable to OCS Sources*, August 21, 1992.

(B) [Reserved]

(3) California.

(i) State requirements.

(A) *State of California Requirements Applicable to OCS Sources*, February 2006.

(ii) Local requirements.

(A)–(D) [Reserved]

(E) *San Luis Obispo County Air Pollution Control District Requirements Applicable to OCS Sources*, February 2000.

(F) *Santa Barbara County Air Pollution Control District Requirements Applicable to OCS Sources*, February 2006.

(G) *South Coast Air Quality Management District Requirements Applicable to OCS Sources* (Part I, II and Part III), February 2006.

(H) *Ventura County Air Pollution Control District Requirements Applicable to OCS Sources*, February 2006.

(4) and (5) [Reserved]

(6) Florida.

(i) State requirements.

(A) State of Florida Requirements Applicable to OCS Sources, January 11, 1995.

(B) [Reserved]

(ii) Local requirements.

(A) [Reserved]

(7)–(16) [Reserved]

(17) North Carolina.

(i) State requirements.

(A) *State of North Carolina Air Pollution Control Requirements Applicable to OCS Sources*, August 21, 1992.

(B) [Reserved]

(ii) Local requirements.

(A) [Reserved]

(18)–(23) [Reserved]

[57 FR 40806, Sept. 4, 1992, as amended at 58 FR 16626, Mar. 30, 1993; 58 FR 59173, Nov. 8, 1993; 59 FR 17270, Apr. 12, 1994; 59 FR 50846, Oct. 6, 1994; 60 FR 47293, Sept. 12, 1995; 60 FR 55327, Oct. 31, 1995; 61 FR 28758, June 6, 1996; 62 FR 41871, Aug. 4, 1997; 65 FR 15869, Mar. 24, 2000; 66 FR 12984, Mar. 1, 2001; 67 FR 14648, Mar. 27, 2002; 69 FR 18803, Apr. 9, 2004; 70 FR 20055, Apr. 18, 2005; 71 FR 35807, June 22, 2006; 72 FR 5939, Feb. 8, 2007]

## § 55.15 Specific designation of corresponding onshore areas.

(a) California.

(1) The South Coast Air Quality Management District is designated as the COA for the following OCS facilities: Edith, Ellen, Elly, and Eureka.

(2) The Ventura County Air Pollution Control District is designated as the COA for the following OCS facilities: Grace, Gilda, Gail and Gina.

(3) The Santa Barbara County Air Pollution Control District is designated as the COA for the following OCS facilities: Habitat, Hacienda, Harmony, Harvest, Heather, Henry, Heritage, Hermosa, Hidalgo, Hillhouse, Hogan, Houchin, Hondo, Irene, Independence (formerly Iris), the OS and T, and Union A, B, and C.

(b) [Reserved]

[58 FR 14159, Mar. 16, 1993]

## APPENDIX A TO PART 55—LISTING OF STATE AND LOCAL REQUIREMENTS INCORPORATED BY REFERENCE INTO PART 55, BY STATE

This appendix lists the titles of the State and local requirements that are contained within the documents incorporated by reference into 40 CFR part 55.

### ALASKA

(a) State requirements.

(1) The following State of Alaska requirements are applicable to OCS Sources, December 3, 2005, Alaska Administrative Code—Department of Environmental Conservation. The following sections of Title 18, Chapter 50:

#### ARTICLE 1. AMBIENT AIR QUALITY MANAGEMENT

18 AAC 50.005. Purpose and Applicability of Chapter (effective 10/1/04)

18 AAC 50.010. Ambient Air Quality Standards (effective 10/1/04)

18 AAC 50.015. Air Quality Designations, Classification, and Control Regions (effective 10/10/04) except (d)(2)

*Table 1. Air Quality Classifications*

18 AAC 50.020. Baseline Dates and Maximum Allowable Increases (effective 10/1/04)

*Table 2. Baseline Dates*

*Table 3. Maximum Allowable Increases*

18 AAC 50.025. Visibility and Other Special Protection Areas (effective 6/21/98)

18 AAC 50.030. State Air Quality Control Plan (effective 10/1/04)
18 AAC 50.035. Documents, Procedures, and Methods Adopted by Reference (effective 12/3/05)
18 AAC 50.040. Federal Standards Adopted by Reference (effective 12/3/05) except (b), (c) (d), and (g)
18 AAC 50.045. Prohibitions (effective 10/1/04)
18 AAC 50.050. Incinerator Emissions Standards (effective 5/3/02)

*Table 4. Particulate Matter Standards for Incinerators*

18 AAC 50.055. Industrial Processes and Fuel-Burning Equipment (effective 10/1/04) except (a)(3) through (a)(9), (b)(4) through (b)(6), (e) and (f)
18 AAC 50.065. Open Burning (effective 1/18/97) except (g) and (h)
18 AAC 50.075. Wood-Fired Heating Device Visible Emission Standards (effective 1/18/97)
18 AAC 50.080. Ice Fog Standards (effective 1/18/97)
18 AAC 50.085. Volatile Liquid Storage Tank Emission Standards (effective 1/18/97)
18 AAC 50.090. Volatile Liquid Loading Racks and Delivery Tank Emission Standards (effective 10/1/04)
18 AAC 50.100 Nonroad Engines (effective 10/1/04)
18 AAC 50.110. Air Pollution Prohibited (effective 5/26/72)

ARTICLE 2. PROGRAM ADMINISTRATION

18 AAC 50.200. Information Requests (effective 10/1/04)
18 AAC 50.201. Ambient Air Quality Investigation (effective 10/1/04)
18 AAC 50.205. Certification (effective 10/1/04)
18 AAC 50.215. Ambient Air Quality Analysis Methods (effective 10/1/04)

*Table 5. Significant Impact Levels (SILs)*

18 AAC 50.220. Enforceable Test Methods (effective 10/1/04)
18 AAC 50.225. Owner-Requested Limits (effective 1/29/05)
18 AAC 50.230. Preapproved Emission Limits (effective 1/29/05)
18 AAC 50.235. Unavoidable Emergencies and Malfunctions (effective 10/1/04)
18 AAC 50.240. Excess Emissions (effective 10/1/04)
18 AAC 50.245. Air Episodes and Advisories (effective 10/1/04)

*Table 6. Concentrations Triggering an Air Episode*

ARTICLE 3. MAJOR STATIONARY SOURCE PERMITS

18 AAC 50.301. Permit Continuity (effective 10/1/04)
18 AAC 50.302. Construction Permits (effective 10/1/04)
18 AAC 50.306. Prevention of Significant Deterioration (PSD) Permits (effective 10/1/04) except (e)
18 AAC 50.311. Nonattainment Area Major Stationary Source Permits (effective 10/1/04)
18 AAC 50.316. Preconstruction Review for Construction or Reconstruction of a Major Source of Hazardous Air Pollutants (effective 12/1/04) except (c)
18 AAC 50.326. Title V Operating Permits (effective 12/1/04) except (j)(1), (k)(3), (k)(5), and (k)(6)
18 AAC 50.345. Construction and Operating Permits: Standard Permit Conditions (effective 10/1/04)
18 AAC 50.346. Construction and Operating Permits: Other Permit Conditions (effective 10/1/04)

*Table 7. Emission Unit or Activity, Standard Permit Condition*

ARTICLE 4. USER FEES

18 AAC 50.400. Permit Administration Fees (effective 1/29/05) except (a), (b), (c)(1), (c)(3), (c)(6), (i)(2), (i)(3), (m)(3) and (m)(4)
18 AAC 50.403. Negotiated Service Agreements (effective 12/3/05) except (8) and (9)
18 AAC 50.405. Transition Process for Permit Fees (effective 1/29/05)
18 AAC 50.410. Emission Fees (effective 12/3/05)
18 AAC 50.499. Definition for User Fee Requirements (effective 1/29/05)

ARTICLE 5. MINOR PERMITS

18 AAC 50.502. Minor Permits for Air Quality Protection (effective 12/3/05) except (b)(1), (b)(2), (b)(3) and (b)(5)
18 AAC 50.508. Minor Permits Requested by the Owner or Operator (effective 10/1/04)
18 AAC 50.509. Construction of a Pollution Control Project without a Permit (effective 10/1/04)
18 AAC 50.540. Minor Permit: Application (effective 12/3/05)
18 AAC 50.542. Minor Permit: Review and Issuance (effective 12/1/04) except (b)(1), (b)(2), (b)(5), and (d)
18 AAC 50.544. Minor Permits: Content (effective 1/29/05)
18 AAC 50.546. Minor Permits: Revisions (effective 10/1/04)
18 AAC 50.560. General Minor Permits (effective 10/1/04) except (b)

ARTICLE 9. GENERAL PROVISIONS

18 AAC 50.990. Definitions (effective 12/3/05)

(b) Local requirements.

(1)–(4) [Reserved]

(5) The following requirements are contained in *San Luis Obispo County Air Pollution*

*Control District Requirements Applicable to OCS Sources*, February 2000:

Rule 103 Conflicts Between District, State and Federal Rules (Adopted 8/6/76)
Rule 105 Definitions (Adopted 1/24/96)
Rule 106 Standard Conditions (Adopted 8/6/76)
Rule 108 Severability (Adopted 11/13/84)
Rule 113 Continuous Emissions Monitoring, except F. (Adopted 7/5/77)
Rule 201 Equipment not Requiring a Permit, except A.1.b. (Revised 4/26/95)
Rule 202 Permits, except A.4. and A.8. (Adopted 11/5/91)
Rule 203 Applications, except B. (Adopted 11/5/91)
Rule 204 Requirements, except B.3. and C. (Adopted 8/10/93)
Rule 209 Provision for Sampling and Testing Facilities (Adopted 11/5/91)
Rule 210 Periodic Inspection, Testing and Renewal of Permits to Operate (Adopted 11/5/91)
Rule 213 Calculations, except E.4. and F. (Adopted 8/10/93)
Rule 302 Schedule of Fees (Adopted 6/18/97)
Rule 305 Fees for Major Non-Vehicular Sources (Adopted 9/15/92)
Rule 401 Visible Emissions (Adopted 8/6/76)
Rule 403 Particulate Matter Emissions (Adopted 8/6/76)
Rule 404 Sulfur Compounds Emission Standards, Limitations and Prohibitions (Revised 12/6/76)
Rule 405 Nitrogen Oxides Emission Standards, Limitations and Prohibitions (Adopted 11/16/93)
Rule 406 Carbon Monoxide Emission Standards, Limitations and Prohibitions (Adopted 11/14/84)
Rule 407 Organic Material Emission Standards, Limitations and Prohibitions (Adopted 5/22/96)
Rule 411 Surface Coating of Metal Parts and Products (Adopted 1/28/98)
Rule 416 Degreasing Operations (Adopted 6/18/79)
Rule 417 Control of Fugitive Emissions of Volatile Organic Compounds (Adopted 2/9/93)
Rule 419 Petroleum Pits, Ponds, Sumps, Well Cellars, and Wastewater Separators (Revised 7/12/94)
Rule 422 Refinery Process Turnarounds (Adopted 6/18/79)
Rule 425 Storage of Volatile Organic Compounds (Adopted 7/12/94)
Rule 427 Marine Tanker Loading (Adopted 4/26/95)
Rule 429 Oxides of Nitrogen and Carbon Monoxide Emissions from Electric Power Generation Boilers (Revised 11/12/97)
Rule 430 Control of Oxides of Nitrogen from Industrial, Institutional, Commercial Boilers, Steam Generators, and Process Heaters (Adopted 7/26/95)
Rule 431 Stationary Internal Combustion Engines (Adopted 11/13/96)
Rule 501 General Burning Provisions (Adopted 1/10/89)
Rule 503 Incinerator Burning, except B.1.a. (Adopted 2/7/89)
Rule 601 New Source Performance Standards (Adopted 5/28/97)

(6) The following requirements are contained in *Santa Barbara County Air Pollution Control District Requirements Applicable to OCS Sources*, February 2006:

Rule 102—Definitions—(Adopted 01/20/05)
Rule 103—Severability—(Adopted 10/23/78)
Rule 106—Notice to Comply for Minor Violations—(Adopted 07/15/99)
Rule 107—Emergencies—(Adopted 04/19/01)
Rule 201—Permits Required—(Adopted 04/17/97)
Rule 202—Exemptions to Rule 201—(Adopted 03/17/05)
Rule 203—Transfer—(Adopted 04/17/97)
Rule 204—Applications—(Adopted 04/17/97)
Rule 205—Standards for Granting Permits—(Adopted 04/17/97)
Rule 206—Conditional Approval of Authority to Construct or Permit to Operate—(Adopted 10/15/91)
Rule 207—Denial of Application—(Adopted 10/23/78)
Rule 210—Fees—(Adopted 03/17/05)
Rule 212—Emission Statements—(Adopted 10/20/92)
Rule 301—Circumvention—(Adopted 10/23/78)
Rule 302—Visible Emissions—(Adopted 10/23/78)
Rule 304—Particulate Matter–Northern Zone—(Adopted 10/23/78)
Rule 305—Particulate Matter Concentration–Southern Zone—(Adopted 10/23/78) —
Rule 306—Dust and Fumes–Northern Zone—(Adopted 10/23/78)
Rule 307—Particulate Matter Emission Weight Rate–Southern Zone—(Adopted 10/23/78)
Rule 308—Incinerator Burning—(Adopted 10/23/78)
Rule 309—Specific Contaminants—(Adopted 10/23/78)
Rule 310—Odorous Organic Sulfides—(Adopted 10/23/78)
Rule 311—Sulfur Content of Fuels—(Adopted 10/23/78)
Rule 312—Open Fires—(Adopted 10/02/90)
Rule 316—Storage and Transfer of Gasoline—(Adopted 04/17/97)
Rule 317—Organic Solvents—(Adopted 10/23/78)
Rule 318—Vacuum Producing Devices or Systems–Southern Zone—(Adopted 10/23/78)
Rule 321—Solvent Cleaning Operations—(Adopted 09/18/97)
Rule 322—Metal Surface Coating Thinner and Reducer—(Adopted 10/23/78)
Rule 323—Architectural Coatings—(Adopted 11/15/01)
Rule 324—Disposal and Evaporation of Solvents—(Adopted 10/23/78)

Rule 325—Crude Oil Production and Separation—(Adopted 07/19/01)
Rule 326—Storage of Reactive Organic Compound Liquids—(Adopted 01/18/01)
Rule 327—Organic Liquid Cargo Tank Vessel Loading—(Adopted 12/16/85)
Rule 328—Continuous Emission Monitoring—(Adopted 10/23/78)
Rule 330—Surface Coating of Metal Parts and Products—(Adopted 01/20/00)
Rule 331—Fugitive Emissions Inspection and Maintenance—(Adopted 12/10/91)
Rule 332—Petroleum Refinery Vacuum Producing Systems, Wastewater Separators and Process Turnarounds—(Adopted 06/11/79)
Rule 333—Control of Emissions from Reciprocating Internal Combustion Engines—(Adopted 04/17/97)
Rule 342—Control of Oxides of Nitrogen ($NO_X$) from Boilers, Steam Generators and Process Heaters)—(Adopted 04/17/97)
Rule 343—Petroleum Storage Tank Degassing—(Adopted 12/14/93)
Rule 344—Petroleum Sumps, Pits, and Well Cellars—(Adopted 11/10/94)
Rule 346—Loading of Organic Liquid Cargo Vessels—(Adopted 01/18/01)
Rule 352—Natural Gas-Fired Fan-Type Central Furnaces and Residential Water Heaters—(Adopted 09/16/99)
Rule 353—Adhesives and Sealants—(Adopted 08/19/99)
Rule 359—Flares and Thermal Oxidizers (Adopted 06/28/94)
Rule 360—Emissions of Oxides of Nitrogen from Large Water Heaters and Small Boilers (Adopted 10/17/02)
Rule 370—Potential to Emit—Limitations for Part 70 Sources (Adopted 06/15/95)
Rule 505—Breakdown Conditions Sections A., B.1,. and D. only (Adopted 10/23/78)
Rule 603—Emergency Episode Plans (Adopted 06/15/81)
Rule 702—General Conformity (Adopted 10/20/94)
Rule 801—New Source Review (Adopted 04/17/97)
Rule 802—Nonattainment Review (Adopted 04/17/97)
Rule 803—Prevention of Significant Deterioration (Adopted 04/17/97)
Rule 804—Emission Offsets (Adopted 04/17/97)
Rule 805—Air Quality Impact Analysis and Modeling (Adopted 04/17/97)
Rule 808—New Source Review for Major Sources of Hazardous Air Pollutants (Adopted 05/20/99)
Rule 1301—Part 70 Operating Permits—General Information (Adopted 06/19/03)
Rule 1302—Part 70 Operating Permits—Permit Application (Adopted 11/09/93)
Rule 1303—Part 70 Operating Permits—Permits (Adopted 11/09/93)
Rule 1304—Part 70 Operating Permits—Issuance, Renewal, Modification and Reopening (Adopted 11/09/93)
Rule 1305—Part 70 Operating Permits—Enforcement (Adopted 11/09/93)

(7) The following requirements are contained in *South Coast Air Quality Management District Requirements Applicable to OCS Sources* (Part I, II and III), February 2006:

Rule 102—Definition of Terms (Adopted 12/3/04)
Rule 103—Definition of Geographical Areas (Adopted 01/9/76)
Rule 104—Reporting of Source Test Data and Analyses (Adopted 01/9/76)
Rule 108—Alternative Emission Control Plans (Adopted 04/6/90)
Rule 109—Recordkeeping for Volatile Organic Compound Emissions (Adopted 08/18/00)
Rule 112—Definition of Minor Violation and Guidelines for Issuance of Notice to Comply (Adopted 11/13/98)
Rule 118—Emergencies (Adopted 12/07/95)
Rule 201—Permit to Construct (Adopted 12/03/04)
Rule 201.1—Permit Conditions in Federally Issued Permits to Construct (Adopted 12/03/04)
Rule 202—Temporary Permit to Operate (Adopted 12/03/04)
Rule 203—Permit to Operate (Adopted 12/03/04)
Rule 204—Permit Conditions (Adopted 03/6/92)
Rule 205—Expiration of Permits to Construct (Adopted 01/05/90)
Rule 206—Posting of Permit to Operate (Adopted 01/05/90)
Rule 207—Altering or Falsifying of Permit (Adopted 01/09/76)
Rule 208—Permit and Burn Authorization for Open Burning (Adopted 12/21/01)
Rule 209—Transfer and Voiding of Permits (Adopted 01/05/90)
Rule 210—Applications (Adopted 01/05/90)
Rule 212—Standards for Approving Permits (Adopted 12/07/95) except (c)(3) and (e)
Rule 214—Denial of Permits (Adopted 01/05/90)
Rule 217—Provisions for Sampling and Testing Facilities (Adopted 01/05/90)
Rule 218—Continuous Emission Monitoring (Adopted 05/14/99)
Rule 218.1—Continuous Emission Monitoring Performance Specifications (Adopted 05/14/99)
Rule 218.1—Attachment A—Supplemental and Alternative CEMS Performance Requirements (Adopted 05/14/99)
Rule 219—Equipment Not Requiring a Written Permit Pursuant to Regulation II (Adopted 12/03/04)
Rule 220—Exemption—Net Increase in Emissions (Adopted 08/07/81)
Rule 221—Plans (Adopted 01/04/85)
Rule 301—Permitting and Associated Fees (Adopted 06/03/05) except (e)(7)and Table IV
Rule 304—Equipment, Materials, and Ambient Air Analyses (Adopted 06/03/05)

Rule 304.1—Analyses Fees (Adopted 06/03/05)
Rule 305—Fees for Acid Deposition (Adopted 10/04/91)
Rule 306—Plan Fees (Adopted 06/03/05)
Rule 309—Fees for Regulation XVI (Adopted 06/03/05)
Rule 401—Visible Emissions (Adopted 11/09/01)
Rule 403—Fugitive Dust (Adopted 06/03/05)
Rule 404—Particulate Matter—Concentration (Adopted 02/07/86)
Rule 405—Solid Particulate Matter—Weight (Adopted 02/07/86)
Rule 407—Liquid and Gaseous Air Contaminants (Adopted 04/02/82)
Rule 408—Circumvention (Adopted 05/07/76)
Rule 409—Combustion Contaminants (Adopted 08/07/81)
Rule 429—Start-Up and Shutdown Exemption Provisions for Oxides of Nitrogen (Adopted 12/21/90)
Rule 430—Breakdown Provisions, (a) and (b) only (Adopted 07/12/96)
Rule 431.1—Sulfur Content of Gaseous Fuels (Adopted 06/12/98)
Rule 431.2—Sulfur Content of Liquid Fuels (Adopted 09/15/00)
Rule 431.3—Sulfur Content of Fossil Fuels (Adopted 05/7/76)
Rule 441—Research Operations (Adopted 05/7/76)
Rule 442—Usage of Solvents (Adopted 12/15/00)
Rule 444—Open Burning (Adopted 12/21/01)
Rule 463—Organic Liquid Storage (Adopted 05/06/05)
Rule 465—Refinery Vacuum-Producing Devices or Systems (Adopted 08/13/99)
Rule 468—Sulfur Recovery Units (Adopted 10/08/76)
Rule 473—Disposal of Solid and Liquid Wastes (Adopted 05/07/76)
Rule 474—Fuel Burning Equipment-Oxides of Nitrogen (Adopted 12/04/81)
Rule 475—Electric Power Generating Equipment (Adopted 08/07/78)
Rule 476—Steam Generating Equipment (Adopted 10/08/76)
Rule 480—Natural Gas Fired Control Devices (Adopted 10/07/77) Addendum to Regulation IV (Effective 1977)
Rule 518—Variance Procedures for Title V Facilities (Adopted 08/11/95)
Rule 518.1—Permit Appeal Procedures for Title V Facilities (Adopted 08/11/95)
Rule 518.2—Federal Alternative Operating Conditions (Adopted 12/21/01)
Rule 701—Air Pollution Emergency Contingency Actions (Adopted 06/13/97)
Rule 702—Definitions (Adopted 07/11/80)
Rule 708—Plans (Rescinded 09/08/95)
Regulation IX—Standard of Performance For New Stationary Sources (Adopted 05/11/01)
Reg. X—National Emission Standards for Hazardous Air Pollutants (NESHAPS) (Adopted 05/11/01)
Rule 1105.1—Reduction of $PM_{10}$ And Ammonia Emissions From Fluid Catalytic Cracking Units (Adopted 11/07/03)
Rule 1106—Marine Coating Operations (Adopted 01/13/95)
Rule 1107—Coating of Metal Parts and Products (Adopted 11/09/01)
Rule 1109—Emissions of Oxides of Nitrogen for Boilers and Process Heaters in Petroleum Refineries (Adopted 08/05/88)
Rule 1110—Emissions from Stationary Internal Combustion Engines (Demonstration) (Repealed 11/14/97)
Rule 1110.1—Emissions from Stationary Internal Combustion Engines (Rescinded 06/03/05)
Rule 1110.2—Emissions from Gaseous- and Liquid-Fueled Engines (Adopted 06/03/05)
Rule 1113—Architectural Coatings (Adopted 07/09/04)
Rule 1116.1—Lightering Vessel Operations-Sulfur Content of Bunker Fuel (Adopted 10/20/78)
Rule 1121—Control of Nitrogen Oxides from Residential-Type Natural Gas-Fired Water Heaters (Adopted 09/03/04)
Rule 1122—Solvent Degreasers (Adopted 10/01/04)
Rule 1123—Refinery Process Turnarounds (Adopted 12/07/90)
Rule 1125—Metal Container, Closure, and Coil Coating Operations (Adopted 01/13/95)
Rule 1129—Aerosol Coatings (Adopted 03/08/96)
Rule 1132—Further Control of VOC Emissions from High-Emitting Spray Booth Facilities (Adopted 5/07/04)
Rule 1134—Emissions of Oxides of Nitrogen from Stationary Gas Turbines (Adopted 08/08/97)
Rule 1136—Wood Products Coatings (Adopted 06/14/96)
Rule 1137—$PM_{10}$ Emission Reductions from Woodworking Operations (Adopted 02/01/02)
Rule 1140—Abrasive Blasting (Adopted 08/02/85)
Rule 1142—Marine Tank Vessel Operations (Adopted 07/19/91)
Rule 1146—Emissions of Oxides of Nitrogen from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters (Adopted 11/17/00)
Rule 1146.1—Emission of Oxides of Nitrogen from Small Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters (Adopted 05/13/94)
Rule 1146.2—Emissions of Oxides of Nitrogen from Large Water Heaters and Small Boilers (Adopted 01/07/05)
Rule 1148—Thermally Enhanced Oil Recovery Wells (Adopted 11/05/82)
Rule 1149—Storage Tank Cleaning And Degassing (Adopted 07/14/95)
Rule 1162—Polyester Resin Operations (Adopted 07/09/04)
Rule 1168—Adhesive and Sealant Applications (Adopted 01/07/05)

Rule 1171—Solvent Cleaning Operations (Adopted 05/06/05)
Rule 1173—Control of Volatile Organic Compounds Leaks and Releases From Components At Petroleum Facilities and Chemical Plants (Adopted 12/06/02)
Rule 1176—VOC Emissions from Wastewater Systems (Adopted 09/13/96)
Rule 1178—Further Reductions of VOC Emissions from Storage Tanks at Petroleum Facilities (Adopted 12/21/01)
Rule 1301—General (Adopted 12/07/95)
Rule 1302—Definitions (Adopted 12/06/02)
Rule 1303—Requirements (Adopted 12/06/02)
Rule 1304—Exemptions (Adopted 06/14/96)
Rule 1306—Emission Calculations (Adopted 12/06/02)
Rule 1313—Permits to Operate (Adopted 12/07/95)
Rule 1403—Asbestos Emissions from Demolition/Renovation Activities (Adopted 04/08/94)
Rule 1470—Requirements for Stationary Diesel-Fueled Internal Combustion and Other Compression Ignition Engines (Adopted 03/04/05)
Rule 1605—Credits for the Voluntary Repair of On-Road Motor Vehicles Identified Through Remote Sensing Devices (Adopted 10/11/96)
Rule 1610—Old-Vehicle Scrapping (Adopted 2/12/99)
Rule 1612—Credits for Clean On-Road Vehicles (Adopted 07/10/98)
Rule 1612.1 Mobile Source Credit Generation Pilot Program (Adopted 03/16/01)
Rule 1620—Credits for Clean Off-Road Mobile Equipment (Adopted 07/10/98)
Rule 1701—General (Adopted 08/13/99)
Rule 1702—Definitions (Adopted 08/13/99)
Rule 1703—PSD Analysis (Adopted 10/07/88)
Rule 1704—Exemptions (Adopted 08/13/99)
Rule 1706—Emission Calculations (Adopted 08/13/99)
Rule 1713—Source Obligation (Adopted 10/07/88)
Regulation XVII—Appendix (effective 1977)
Rule 1901—General Conformity (Adopted 09/09/94)
Regulation XX—Regional Clean Air Incentives Market (Reclaim)
Rule 2000—General (Adopted 05/06/05)
Rule 2001—Applicability (Adopted 05/06/05)
Rule 2002—Allocations for Oxides of Nitrogen ($NO_X$) and Oxides of Sulfur (SOx) (Adopted 01/07/05)
Rule 2004—Requirements (Adopted 05/11/01) except (l)
Rule 2005—New Source Review for RECLAIM (Adopted 05/06/05) except (i)
Rule 2006—Permits (Adopted 05/11/01)
Rule 2007—Trading Requirements (Adopted 05/06/05)
Rule 2008—Mobile Source Credits (Adopted 10/15/93)
Rule 2009—Compliance Plan for Power Producing Facilities (Adopted 01/07/05)
Rule 2010—Administrative Remedies and Sanctions (Adopted 01/07/05)
Rule 2011—Requirements for Monitoring, Reporting, and Recordkeeping for Oxides of Sulfur (SOx) Emissions (Adopted 05/06/05)
Appendix A Volume IV—(Protocol for oxides of sulfur) (Adopted 05/06/05)
Rule 2012—Requirements for Monitoring, Reporting, and Recordkeeping for Oxides of Nitrogen ($NO_X$) Emissions (Adopted 05/06/05)
Appendix A—Volume V—(Protocol for oxides of nitrogen) (Adopted 05/06/05)
Rule 2015—Backstop Provisions (Adopted 06/04/04) except (b)(1)(G) and (b)(3)(B)
Rule 2020—RECLAIM Reserve (Adopted 05/11/01)
Rule 2100—Registration of Portable Equipment (Adopted 07/11/97)
Rule 2506—Area Source Credits for $NO_X$ and $SO_X$ (Adopted 12/10/99)
XXX—Title V Permits
Rule 3000—General (Adopted 11/14/97)
Rule 3001—Applicability (Adopted 11/14/97)
Rule 3002—Requirements (Adopted 11/14/97)
Rule 3003—Applications (Adopted 03/16/01)
Rule 3004—Permit Types and Content (Adopted 12/12/97)
Rule 3005—Permit Revisions (Adopted 03/16/01)
Rule 3006—Public Participation (Adopted 11/14/97)
Rule 3007—Effect of Permit (Adopted 10/08/93)
Rule 3008—Potential To Emit Limitations (Adopted 03/16/01)
XXXI—Acid Rain Permit Program (Adopted 02/10/95)

(8) The following requirements are contained in *Ventura County Air Pollution Control District Requirements Applicable to OCS Sources*, February 2006:

Rule 2—Definitions (Adopted 04/13/04)
Rule 5—Effective Date (Adopted 04/13/04)
Rule 6—Severability (Adopted 11/21/78)
Rule 7—Zone Boundaries (Adopted 06/14/77)
Rule 10—Permits Required (Adopted 04/13/04)
Rule 11—Definition for Regulation II (Adopted 06/13/95)
Rule 12—Applications for Permits (Adopted 06/13/95)
Rule 13—Action on Applications for an Authority to Construct (Adopted 06/13/95)
Rule 14—Action on Applications for a Permit to Operate (Adopted 06/13/95)
Rule 15.1—Sampling and Testing Facilities (Adopted 10/12/93)
Rule 16—BACT Certification (Adopted 06/13/95)
Rule 19—Posting of Permits (Adopted 05/23/72)
Rule 20—Transfer of Permit (Adopted 05/23/72)
Rule 23—Exemptions from Permits (Adopted 10/12/04)
Rule 24— Source Recordkeeping, Reporting, and Emission Statements (Adopted 09/15/92)

Rule 26—New Source Review—General (Adopted 10/22/91)
Rule 26.1—New Source Review—Definitions (Adopted 05/14/02)
Rule 26.2—New Source Review—Requirements (Adopted 05/14/02)
Rule 26.3—New Source Review—Exemptions (Adopted 05/14/02)
Rule 26.6—New Source Review—Calculations (Adopted 05/14/02)
Rule 26.8—New Source Review—Permit To Operate (Adopted 10/22/91)
Rule 26.10—New Source Review—PSD (Adopted 01/13/98)
Rule 26.11—New Source Review—ERC Evaluation At Time of Use (Adopted 05/14/02)
Rule 28—Revocation of Permits (Adopted 07/18/72)
Rule 29—Conditions on Permits (Adopted 10/22/91)
Rule 30—Permit Renewal (Adopted 04/13/04)
Rule 32—Breakdown Conditions: Emergency Variances, A., B.1., and D. only. (Adopted 02/20/79)
Rule 33—Part 70 Permits—General (Adopted 10/12/93)
Rule 33.1—Part 70 Permits—Definitions (Adopted 04/10/01)
Rule 33.2—Part 70 Permits—Application Contents (Adopted 04/10/01)
Rule 33.3—Part 70 Permits—Permit Content (Adopted 04/10/01)
Rule 33.4—Part 70 Permits—Operational Flexibility (Adopted 04/10/01)
Rule 33.5—Part 70 Permits—Time frames for Applications, Review and Issuance (Adopted 10/12/93)
Rule 33.6—Part 70 Permits—Permit Term and Permit Reissuance (Adopted 10/12/93)
Rule 33.7—Part 70 Permits—Notification (Adopted 04/10/01)
Rule 33.8—Part 70 Permits—Reopening of Permits (Adopted 10/12/93)
Rule 33.9—Part 70 Permits—Compliance Provisions (Adopted 04/10/01)
Rule 33.10—Part 70 Permits—General Part 70 Permits (Adopted 10/12/93)
Rule 34—Acid Deposition Control (Adopted 03/14/95)
Rule 35—Elective Emission Limits (Adopted 11/12/96)
Rule 36—New Source Review—Hazardous Air Pollutants (Adopted 10/06/98)
Rule 42—Permit Fees (Adopted 04/13/04)
Rule 44—Exemption Evaluation Fee (Adopted 09/10/96)
Rule 45—Plan Fees (Adopted 06/19/90)
Rule 45.2—Asbestos Removal Fees (Adopted 08/04/92)
Rule 47—Source Test, Emission Monitor, and Call-Back Fees (Adopted 06/22/99)
Rule 50—Opacity (Adopted 04/13/04)
Rule 52—Particulate Matter-Concentration (Grain Loading)(Adopted 04/13/04)
Rule 53—Particulate Matter-Process Weight (Adopted 04/13/04)
Rule 54—Sulfur Compounds (Adopted 06/14/94)
Rule 56—Open Burning (Adopted 11/11/03)
Rule 57—Incinerators (Adopted 01/11/05)
Rule 57.1—Particulate Matter Emissions from Fuel Burning Equipment (Adopted 01/11/05)
Rule 62.7—Asbestos—Demolition and Renovation (Adopted 09/01/92)
Rule 63—Separation and Combination of Emissions (Adopted 11/21/78)
Rule 64—Sulfur Content of Fuels (Adopted 04/13/99)
Rule 67—Vacuum Producing Devices (Adopted 07/05/83)
Rule 68—Carbon Monoxide (Adopted 04/13/04)
Rule 71—Crude Oil and Reactive Organic Compound Liquids (Adopted 12/13/94)
Rule 71.1—Crude Oil Production and Separation (Adopted 06/16/92)
Rule 71.2—Storage of Reactive Organic Compound Liquids (Adopted 09/26/89)
Rule 71.3—Transfer of Reactive Organic Compound Liquids (Adopted 06/16/92)
Rule 71.4—Petroleum Sumps, Pits, Ponds, and Well Cellars (Adopted 06/08/93)
Rule 71.5—Glycol Dehydrators (Adopted 12/13/94)
Rule 72—New Source Performance Standards (NSPS) (Adopted 04/10/01)
Rule 73—National Emission Standards for Hazardous Air Pollutants (NESHAPS (Adopted 04/10/01)
Rule 74—Specific Source Standards (Adopted 07/06/76)
Rule 74.1—Abrasive Blasting (Adopted 11/12/91)
Rule 74.2—Architectural Coatings (Adopted 11/13/01)
Rule 74.6—Surface Cleaning and Degreasing (Adopted 11/11/03—effective 07/01/04)
Rule 74.6.1—Batch Loaded Vapor Degreasers (Adopted 11/11/03—effective 07/01/04)
Rule 74.7—Fugitive Emissions of Reactive Organic Compounds at Petroleum Refineries and Chemical Plants (Adopted 10/10/95)
Rule 74.8—Refinery Vacuum Producing Systems, Waste-water Separators and Process Turnarounds (Adopted 07/05/83)
Rule 74.9—Stationary Internal Combustion Engines (Adopted 11/14/00)
Rule 74.10—Components at Crude Oil Production Facilities and Natural Gas Production and Processing Facilities (Adopted 03/10/98)
Rule 74.11—Natural Gas-Fired Residential Water Heaters-Control of $NO_x$ (Adopted 04/09/85)
Rule 74.11.1—Large Water Heaters and Small Boilers (Adopted 09/14/99)
Rule 74.12—Surface Coating of Metal Parts and Products (Adopted 11/11/03)
Rule 74.15—Boilers, Steam Generators and Process Heaters (Adopted 11/08/94)
Rule 74.15.1—Boilers, Steam Generators and Process Heaters (Adopted 06/13/00)
Rule 74.16—Oil Field Drilling Operations (Adopted 01/08/91)

Rule 74.20—Adhesives and Sealants (Adopted 01/11/05)
Rule 74.23—Stationary Gas Turbines (Adopted 1/08/02)
Rule 74.24—Marine Coating Operations (Adopted 11/11/03)
Rule 74.24.1—Pleasure Craft Coating and Commercial Boatyard Operations (Adopted 01/08/02)
Rule 74.26—Crude Oil Storage Tank Degassing Operations (Adopted 11/08/94)
Rule 74.27—Gasoline and ROC Liquid Storage Tank Degassing Operations (Adopted 11/08/94)
Rule 74.28—Asphalt Roofing Operations (Adopted 05/10/94)
Rule 74.30—Wood Products Coatings (Adopted 11/11/03)
Rule 75—Circumvention (Adopted 11/27/78)
Rule 101—Sampling and Testing Facilities (Adopted 05/23/72)
Rule 102—Source Tests (Adopted 04/13/04)
Rule 103—Continuous Monitoring Systems (Adopted 02/09/99)
Rule 154—Stage 1 Episode Actions (Adopted 09/17/91)
Rule 155—Stage 2 Episode Actions (Adopted 09/17/91)
Rule 156—Stage 3 Episode Actions (Adopted 09/17/91)
Rule 158—Source Abatement Plans (Adopted 09/17/91)
Rule 159—Traffic Abatement Procedures (Adopted 09/17/91)
Rule 220—General Conformity (Adopted 05/09/95)
Rule 230—Notice to Comply (Adopted 11/09/99)

FLORIDA

(1) The following requirements are contained in *State of Florida Requirements Applicable to OCS Sources*, January 11, 1995:

Florida Administrative Code-Department of Environmental Protection. The following sections of Chapter 62:
4.001 Scope of Part I (Adopted 8/31/88)
4.020 Definitions (Adopted 7/11/93)
4.021 Transferability of Definitions (Adopted 8/31/88)
4.030 General Prohibitions (Adopted 8/31/88)
4.040 Exemptions (Adopted 8/31/88)
4.050 Procedure to Obtain Permit; Application, except (4)(b) through (4)(l) and 4(r) (Adopted 11/23/94)
4.070 Standards for Issuing or Denying Permits; Issuance; Denial (Adopted 3/28/91)
4.080 Modification of Permit Conditions (Adopted 3/19/90)
4.090 Renewals (Adopted 7/11/93)
4.100 Suspension and Revocation (Adopted 8/31/88)
4.110 Financial Responsibility (Adopted 8/31/88)
4.120 Transfer of Permits (Adopted 3/19/90)
4.130 Plant Operation—Problems (Adopted 8/31/88)
4.160 Permit Conditions, except (16) and (17) (Adopted 7/11/93)
4.200 Scope of Part II (Adopted 8/31/88)
4.210 Construction Permits (Adopted 8/31/88)
4.220 Operation Permits for New Sources (Adopted 8/31/88)
4.510 Scope of Part III (Adopted 8/31/88)
4.520 Definitions (Adopted 7/11/90)
4.530 Procedures (Adopted 3/19/90)
4.540 General Conditions for all General Permits (Adopted 8/31/88)
210.100 Purpose and Scope (Adopted 11/23/94)
210.200 Definitions (Adopted 11/23/94)
210.300 Permits Required (Adopted 11/23/94)
210.360 Administrative Permit Corrections (Adopted 11/23/94)
210.370 Reports (Adopted 11/23/94)
210.400 Emission Estimates (Adopted 11/23/94)
210.500 Air Quality Models (Adopted 11/23/94)
210.550 Stack Height Policy (Adopted 11/23/94)
210.600 Enhanced Monitoring (Adopted 11/23/94)
210.650 Circumvention (Adopted 9/25/92)
210.700 Excess Emissions (Adopted 11/23/94)
210.900 Forms (Adopted 11/23/94)
210.980 Severability (Adopted 9/25/92)
212.100 Purpose and Scope (Adopted 2/2/93)
212.200 Definitions (Adopted 2/2/93)
212.300 Sources Not Subject to Prevention of Significant Deterioration or Nonattainment Requirements (Adopted 9/25/92)
212.400 Prevention of Significant Deterioration (Adopted 2/2/93)
212.410 Best Available Control Technology (BACT) (Adopted 9/25/92)
212.500 New Source Review for Nonattainment Areas (Adopted 2/2/93)
212.510 Lowest Achievable Emission Rate (LAER) (Adopted 9/25/92)
212.600 Source Specific New Source Review Requirements (Adopted 9/25/92)
212.700 Source Reclassification (Adopted 9/25/92)
256.100 Declaration and Intent (Adopted 11/30/94)
256.200 Definitions (Adopted 11/30/94)
256.300 Prohibitions (Adopted 11/30/94)
256.450 Open Burning Allowed (Adopted 6/27/91)
256.600 Industrial, Commercial, Municipal and Research Open Burning (Adopted 8/26/87)
256.700 Open Burning Allowed (Adopted 11/30/94)
272.100 Purpose and Scope (Adopted 11/23/94)
272.200 Definitions (Adopted 11/23/94)
272.300 Ambient Air Quality Standards (Adopted 11/23/94)
272.500 Maximum Allowable Increases (Prevention of Significant Deterioration) (Adopted 11/23/94)
272.750 DER Ambient Test Methods (Adopted 9/25/92)
273.200 Definitions (Adopted 9/25/92)
273.300 Air Pollution Episodes (Adopted 9/25/92)
273.400 Air Alert (Adopted 9/25/92)

273.500 Air Warning (Adopted 9/25/92)
273.600 Air Emergency (Adopted 9/25/92)
296.100 Purpose and Scope (Adopted 11/23/94)
296.200 Definitions (Adopted 11/23/94)
296.310 General Particulate Emission Limiting Standards (Adopted 11/23/94)
296.320 General Pollutant Emission Limiting Standards, except (2) (Adopted 2/2/93)
296.330 Best Available Control Technology (BACT) (Adopted 11/23/94)
296.400 Specific Emission Limiting and Performance Standards (Adopted 11/23/94)
296.500 Reasonably Available Control Technology (RACT)—Volatile Organic Compounds (VOC) and Nitrogen Oxides ($NO_X$) Emitting Facilities (Adopted 11/23/94)
296.570 Reasonably Available Control Technology (RACT)—Requirements for Major VOC- and $NO_X$-Emitting Facilities (Adopted 11/23/94)
296.600 Reasonably Available Control Technology (RACT)—Lead (Adopted 8/8/94)
296.601 Lead Processing Operations in General (Adopted 8/8/94)
296.700 Reasonably Available Control Technology (RACT)—Particulate Matter, except (2)(f) (Adopted 11/23/94)
296.800 Standards of Performance for New Stationary Sources (NSPS) (Adopted 11/23/94)
296.810 National Emission Standards for Hazardous Air Pollutants (NESHAP)—Part 61 (Adopted 11/23/94)
296.820 National Emission Standards for Hazardous Air Pollutants (NESHAP)—Part 63 (Adopted 11/23/94)
297.100 Purpose and Scope (Adopted 11/23/94)
297.200 Definitions (Adopted 11/23/94)
297.310 General Test Requirements (Adopted 11/23/94)
297.330 Applicable Test Procedures (Adopted 11/23/94)
297.340 Frequency of Compliance Tests (Adopted 11/23/94)
297.345 Stack Sampling Facilities Provided by the Owner of an Air Pollution Point Source (Adopted 11/23/94)
297.350 Determination of Process Variables (Adopted 11/23/94)
297.400 EPA Methods Adopted by Reference (Adopted 11/23/94)
297.401 EPA Test Procedures (Adopted 11/23/94)
297.411 DER Method 1 (Adopted 11/23/94)
297.412 DER Method 2 (Adopted 12/2/92)
297.413 DER Method 3 (Adopted 12/2/92)
297.414 DER Method 4 (Adopted 12/2/92)
297.415 DER Method 5 (Adopted 11/23/94)
297.416 DER Method 5A (Adopted 12/2/92)
297.417 DER Method 6 (Adopted 11/23/94)
297.418 DER Method 7 (Adopted 12/2/92)
297.419 DER Method 8 (Adopted 12/2/92)
297.420 DER Method 9 (Adopted 11/23/94)
297.421 DER Method 10 (Adopted 12/2/92)
297.422 DER Method 11 (Adopted 12/2/92)
297.423 DER Method 12—Determination of Inorganic Lead Emissions from Stationary Sources (Adopted 11/23/94)
297.424 DER Method 13 (Adopted 12/2/92)
297.440 Supplementary Test Procedures (Adopted 11/23/94)
297.450 EPA VOC Capture Efficiency Test Procedures (Adopted 11/23/94)
297.520 EPA Performance Specifications (Adopted 11/23/94)
297.570 Test Report (Adopted 11/23/94)
297.620 Exceptions and Approval of Alternate Procedures and Requirements (Adopted 11/23/94)

(b) Local requirements.
(1) [Reserved]

NORTH CAROLINA

(a) State requirements.
(1) The following requirements are contained in *State of North Carolina Air Pollution Control Requirements Applicable to OCS Sources,* August 21, 1992: The following sections of Subchapters 2D and 2H:

2D.0101 Definitions (Adopted 12/1/89)
2D.0104 Adoption by Reference Updates (Adopted 10/1/89)
2D.0201 Classification of Air Pollution Sources (Adopted 7/1/84)
2D.0202 Registration of Air Pollution Sources (Adopted 6/1/85)
2D.0303 Emission Reduction Plans (Adopted 7/1/84)
2D.0304 Preplanned Abatement Program (Adopted 7/1/88)
2D.0305 Emission Reduction Plan; Alert Level (Adopted 7/1/84)
2D.0306 Emission Reduction Plan; Warning Level (Adopted 7/1/84)
2D.0307 Emission Reduction Plan; Emergency Level (Adopted 7/1/84)
2D.0401 Purpose (Adopted 10/1/89)
2D.0501 Compliance with Emission Control Standards (Adopted 10/1/89)
2D.0502 Purpose (Adopted 6/1/85)
2D.0503 Particulates from Fuel Burning Indirect Heat Exchanger (Adopted 6/1/85)
2D.0505 Control of Particulate from Incinerators (Adopted 7/1/87)
2D.0510 Particulates: Sand, Gravel and Crushed Stone Operations (Adopted 1/1/85)
2D.0511 Particulates, $SO_2$ from Lightweight Aggregate Processes (Adopted 10/1/89)
2D.0515 Particulates from Miscellaneous Industrial Processes (Adopted 1/1/85)
2D.0516 Sulfur Dioxide Emissions Combustion Sources (Adopted 10/1/89)
2D.0518 Miscellaneous Volatile Organic Compound Emissions (Adopted 2/1/83)
2D.0519 Control of Nitrogen Dioxide Emissions (Adopted 10/1/89)
2D.0520 Control and Prohibition of Open Burning (Adopted 1/1/85)
2D.0521 Control of Visible Emissions (Adopted 8/1/87)

2D.0530 Prevention of Significant Deterioration (Adopted 10/1/89)
2D.0531 Sources in Nonattainment Area (Adopted 12/1/89)
2D.0532 Sources Contributing to an Ambient Violation (Adopted 10/1/89)
2D.0533 Stack Height (Adopted 7/1/87)
2D.0535 Excess Emissions Reporting and Malfunctions, (a) and (f) only. (Adopted 5/1/90)
2D.0537 Control of Mercury Emissions (Adopted 6/1/85)
2D.0601 Purpose and Scope (Adopted 7/1/84)
2D.0602 Definitions (Adopted 7/1/84)
2D.0604 Sources Covered by Implementation Plan Requirements (Adopted 7/1/88)
2D.0606 Other Coal or Residual Oil Burners (Adopted 5/1/85)
2D.0607 Exceptions to Monitoring and Reporting (Adopted 7/1/84)
2D.0901 Definitions (Adopted 12/1/89)
2D.0902 Applicability (Adopted 5/1/90)
2D.0903 Recordkeeping, Reporting, Monitoring (Adopted 12/1/89)
2D.0906 Circumvention (Adopted 1/1/85)
2D.0912 General Provisions on Test Methods and Procedures (Adopted 12/1/89)
2D.0914 Determination of VOC Emission Control System Efficiency (Adopted 1/1/85)
2D.0925 Petroleum Liquid Storage (Adopted 12/1/89)
2D.0933 Petroleum Liquid Storage in External Floating Roof Tanks (Adopted 12/1/89)
2D.0939 Determination of Volatile Organic Compound Vapor Emissions (Adopted 7/1/88)
2D.1101 Purpose (Adopted 5/1/90)
2D.1102 Applicability (Adopted 5/1/90)
2D.1103 Definition (Adopted 5/1/90)
2D.1104 Toxic Air Pollutant Guidelines (Adopted 5/1/90)
2D.1105 Facility Reporting, Recordkeeping (Adopted 5/1/90)
2D.1106 Determination of Ambient Air Concentrations (Adopted 5/1/90)
2D.1107 Multiple Facilities (Adopted 5/1/90)
2D.1108 Multiple Pollutants (Adopted 5/1/90)
2H.0601 Purpose and Scope (Adopted 10/1/89)
2H.0602 Definitions (Adopted 5/1/90)
2H.0603 Applications (Adopted 12/1/89)
2H.0609 Permit Fees (Adopted 8/1/88)
2H.0610 Permit Requirements for Toxic Air Pollutants (Adopted 5/1/90)

(b) Local requirements.

(1) [Reserved]

[57 FR 40806, Sept. 4, 1992, as amended at 58 FR 16626, Mar. 30, 1993; 58 FR 59173, Nov. 8, 1993; 59 FR 17271, Apr. 12, 1994; 59 FR 50846, Oct. 6, 1994; 60 FR 47293, Sept. 12, 1995; 60 FR 55328, Oct. 31, 1995; 61 FR 28758, June 6, 1996; 62 FR 41871, Aug.4, 1997; 65 FR 15870, Mar. 24, 2000; 66 FR 12984, Mar. 1, 2001; 67 FR 14648, Mar. 27, 2002; 70 FR 20055, Apr. 18, 2005; 71 FR 35807, June 22, 2006; 72 FR 5939, Feb. 8, 2007]

# PART 56—REGIONAL CONSISTENCY

Sec.
56.1 Definitions.
56.2 Scope.
56.3 Policy.
56.4 Mechanisms for fairness and uniformity—Responsibilities of Headquarters employees.
56.5 Mechanisms for fairness and uniformity—Responsibilities of Regional Office employees.
56.6 Dissemination of policy and guidance.
56.7 State agency performance audits.

AUTHORITY: Sec. 301(a)(2) of the Clean Air Act as amended (42 U.S.C. 7601).

SOURCE: 45 FR 85405, Dec. 24, 1980, unless otherwise noted.

## §56.1 Definitions.

As used in this part, all terms not defined herein have the meaning given them in the Clean Air Act.

*Act* means the Clean Air Act as amended (42 U.S.C. 7401 *et seq.*).

*Administrator*, *Deputy Administrator*, *Assistant Administrator*, *General Counsel*, *Associate General Counsel*, *Deputy Assistant Administrator*, *Regional Administrator*, *Headquarters*, *Staff Office*, *Operational Office*, and *Regional Office* are described in part 1 of this title.

*Mechanism* means an administrative procedure, guideline, manual, or written statement.

*Program directive* means any formal written statement by the Administrator, the Deputy Administrator, the Assistant Administrator, a Staff Office Director, the General Counsel, a Deputy Assistant Administrator, an Associate General Counsel, or a division Director of an Operational Office that is intended to guide or direct Regional Offices in the implementation or enforcement of the provisions of the act.

*Responsible official* means the EPA Administrator or any EPA employee who is accountable to the Administrator for carrying out a power or duty delegated under section 301(a)(1) of the act, or is accountable in accordance with EPA's formal organization for a particular program or function as described in part 1 of this title.

## §56.2 Scope.

This part covers actions taken by:

(a) Employees in EPA Regional Offices, including Regional Administrators, in carrying out powers and duties delegated by the Administrator under section 301(a)(1) of the act; and

(b) EPA employees in Headquarters to the extent that they are responsible for developing the procedures to be employed or policies to be followed by Regional Offices in implementing and enforcing the act.

### § 56.3 Policy.

It is EPA's policy to:

(a) Assure fair and uniform application by all Regional Offices of the criteria, procedures, and policies employed in implementing and enforcing the act;

(b) Provide mechanisms for identifying and correcting inconsistencies by standardizing criteria, procedures, and policies being employed by Regional Office employees in implementing and enforcing the act; and

(c) Insure an adequate quality audit for each State's performance in implementing and enforcing the act.

### § 56.4 Mechanisms for fairness and uniformity—Responsibilities of Headquarters employees.

(a) The Administrator shall include, as necessary, with any rule or regulation proposed or promulgated under parts 51 and 58 of this chapter[1] mechanisms to assure that the rule or regulation is implemented and enforced fairly and uniformly by the Regional Offices.

(b) The determination that a mechanism required under paragraph (a) of this section is unnecessary for a rule or regulation shall be explained in writing by the responsible EPA official and included in the supporting documentation or the relevant docket.

### § 56.5 Mechanisms for fairness and uniformity—Responsibilities of Regional Office employees.

(a) Each responsible official in a Regional Office, including the Regional Administrator, shall assure that actions taken under the act:

(1) Are carried out fairly and in a manner that is consistent with the Act and Agency policy as set forth in the Agency rules and program directives,

(2) Are as consistent as reasonably possible with the activities of other Regional Offices, and

(3) Comply with the mechanisms developed under § 56.4 of this part.

(b) A responsible official in a Regional Office shall seek concurrence from the appropriate EPA Headquarters office on any interpretation of the Act, or rule, regulation, or program directive when such interpretation may result in inconsistent application among the Regional Offices of the act or rule, regulation, or program directive.

(c) In reviewing State Implementation Plans, the Regional Office shall follow the provisions of the guideline, revisions to State Implementation Plans—Procedures for Approval/Disapproval Actions, OAQPS No. 1.2–005A, or revision thereof. Where regulatory actions may involve inconsistent application of the requirements of the act, the Regional Offices shall classify such actions as special actions.

### § 56.6 Dissemination of policy and guidance.

The Assistant Administrators of the Offices of Air, Noise and Radiation, and of Enforcement, and the General Counsel shall establish as expeditiously as practicable, but no later than one year after promulgation of this part, systems to disseminate policy and guidance. They shall distribute material under foregoing systems to the Regional Offices and State and local agencies, and shall make the material available to the public. Air programs policy and guideline systems shall contain the following:

(a) Compilations of relevant EPA program directives and guidance, except for rules and regulations, concerning the requirements under the Act.

(b) Procedures whereby each Headquarters program office and staff office will enter new and revised guidance into the compilations and cause superseded guidance to be removed.

(c) Additional guidance aids such as videotape presentations, workshops,

[1] Part 51 is entitled, ''Requirements for Preparation, Adoption, and Submittal of Implementation Plans.'' Part 58 is entitled, ''Ambient Air Quality Surveillance.''

manuals, or combinations of these where the responsible Headquarters official determines they are necessary to inform Regional Offices, State and local agencies, or the public about EPA actions.

**§ 56.7 State agency performance audits.**

(a) EPA will utilize the provisions of subpart B, Program Grants, of part 35 of this chapter, which require yearly evaluations of the manner in which grantees use Federal monies, to assure that an adequate evaluation of each State's performance in implementing and enforcing the act is performed.

(b) Within 60 days after comment is due from each State grantee on the evaluation report required by § 35.538 of this chapter, the Regional Administrator shall incorporate or include any comments, as appropriate, and publish notice of availability of the evaluation report in the FEDERAL REGISTER.

# PART 57—PRIMARY NONFERROUS SMELTER ORDERS

## Subpart A—General

Sec.
57.101 Purpose and scope.
57.102 Eligibility.
57.103 Definitions.
57.104 Amendment of the NSO.
57.105 Submittal of required plans, proposals, and reports.
57.106 Expiration date.
57.107 The State or local agency's transmittal to EPA.
57.108 Comparable existing SIP provisions.
57.109 Maintenance of pay.
57.110 Reimbursement of State or local agency.
57.111 Severability of provisions.

## Subpart B—The Application and the NSO Process

57.201 Where to apply.
57.202 How to apply.
57.203 Contents of the application.
57.204 EPA action on second period NSOs which have already been issued.
57.205 Submission of supplementary information upon relaxation of an $SO_2$ SIP emission limitation.

## Subpart C—Constant Controls and Related Requirements

57.301 General requirements.
57.302 Performance level of interim constant controls.
57.303 Total plantwide emission limitation.
57.304 Bypass, excess emissions and malfunctions.
57.305 Compliance monitoring and reporting.

## Subpart D—Supplementary Control System Requirements

57.401 General requirements.
57.402 Elements of the supplementary control system.
57.403 Written consent.
57.404 Measurements, records, and reports.
57.405 Formulation, approval, and implementation of requirements.

## Subpart E—Fugitive Emission Evaluation and Control

57.501 General requirements.
57.502 Evaluation.
57.503 Control measures.
57.504 Continuing evaluation of fugitive emission control measures.
57.505 Amendments of the NSO.

## Subpart F—Research and Development Requirements

57.601 General requirements.
57.602 Approval of proposal.
57.603 Criteria for approval.
57.604 Evaluation of projects.
57.605 Consent.
57.606 Confidentiality.

## Subpart G—Compliance Schedule Requirements

57.701 General requirements.
57.702 Compliance with constant control emission limitation.
57.703 Compliance with the supplementary control system requirements.
57.704 Compliance with fugitive emission evaluation and control requirements.
57.705 Contents of SIP Compliance Schedule required by § 57.201(d) (2) and (3).

## Subpart H—Waiver of Interim Requirement for Use of Continuous Emission Reduction Technology

57.801 Purpose and scope.
57.802 Request for waiver.
57.803 Issuance of tentative determination; notice.
57.804 Request for hearing; request to participate in hearing.
57.805 Submission of written comments on tentative determination.
57.806 Presiding Officer.
57.807 Hearing.
57.808 Opportunity for cross-examination.

57.809 *Ex parte* communications.
57.810 Filing of briefs, proposed findings, and proposed recommendations.
57.811 Recommended decision.
57.812 Appeal from or review of recommended decision.
57.813 Final decision.
57.814 Administrative record.
57.815 State notification.
57.816 Effect of negative recommendation.
APPENDIX A TO PART 57—PRIMARY NONFERROUS SMELTER ORDER (NSO) APPLICATION

AUTHORITY: Secs. 110, 114, 119, 301, Clean Air Act, as amended (42 U.S.C. 7410, 7414, 7419, and 7601); sec. 406 of Pub. L. 95–95.

SOURCE: 50 FR 6448, Feb. 15, 1985, unless otherwise noted.

## Subpart A—General

### § 57.101 Purpose and scope.

(a) *Applicability of the regulations.* The regulations in subparts A through H govern:

(1) The eligibility of smelters for a Primary Nonferrous Smelter Order (NSO) under section 119 of the Clean Air Act;

(2) The procedures through which an NSO can be approved or issued by EPA; and

(3) The minimum contents of each NSO required for EPA issuance or approval under section 119. Subpart I *et seq.*, will contain NSOs in effect for individual smelters.

(b) *State authority to adopt more stringent requirements.* Nothing in this part shall preclude a State from imposing more stringent requirements, as provided by section 116 of the Clean Air Act.

### § 57.102 Eligibility.

(a) A primary copper, lead, zinc, molybdenum, or other nonferrous smelter is eligible for an NSO if it meets the following conditions:

(1) The smelter was in existence and operating on August 7, 1977;

(2) The smelter is subject to an approved or promulgated sulfur dioxide ($SO_2$) State Implementation Plan (SIP) emission limitation which is adequate to ensure that National Ambient Air Quality Standards (NAAQS) for $SO_2$ are achieved without the use of any unauthorized dispersion techniques; and

(3) The Administrator determines, based on a showing by the smelter owner, that no means of emission limitation applicable to the smelter which would enable it to comply with its SIP stack emission limitation for $SO_2$ has been adequately demonstrated to be reasonably available (taking into account the cost of compliance, nonair quality health and environmental impact, and energy considerations) in accordance with § 57.201(d)(1).

(b) For the purposes of these regulations:

(1) The following means of emission limitation shall be considered adequately demonstrated for nonferrous smelters. (Taking into account nonair quality health and environmental impact and energy considerations, but not the cost of compliance).

(i) *Retrofit control technologies.* (A) Sulfuric acid plant in conjunction with an adequately demonstrated replacement technology or process modification;

(B) Magnesium oxide (concentration) scrubbing;

(C) Lime/limestone scrubbing; and

(D) Ammonia scrubbing.

(ii) *Replacement or process modifications.* (A) Flash smelting;

(B) Oxygen enrichment;

(C) Supplemental sulfur burning in conjunction with acid plant;

(D) Electric Furnace;

(E) Noranda process;

(F) Fluid bed roaster;

(G) Continuous smelting (Mitsubishi) process; and

(H) Strong stream/weak stream gas blending.

(2) Each adequately demonstrated means of emission limitation which would enable a smelter to comply with its SIP emission limitation for $SO_2$ shall be considered applicable to the smelter unless the smelter operator demonstrates that the use of a particular system at that smelter is technically unreasonable, for reasons specific to that site.

(3) An applicable means of emission limitation which would enable a smelter to comply with its SIP emission limitation for $SO_2$ shall be considered adequately demonstrated to be reasonably available to the smelter (taking into account the cost of compliance) if the

information submitted under §§ 57.107(a) and 57.203(b) (plus any necessary supplemental information) shows, according to the criteria, procedures, and tests contained in appendix A to this part and in accordance with § 57.201(d)(1), that both of the following two tests are met.

(i) *The rate of return test.* The present value of the smelter's future net cash flow (during and after investment in constant control technology) is more than book value of the smelter's net investment in constant dollars.

(ii) *The profit protection test.* The constant control technology expenditure reduces the present value of the smelter's forecast pretax profits by less than 50%.

(c) When applying for an NSO, a smelter must establish, for purposes of applying the financial eligibility tests, which adequately demonstrated constant control technology applicable to that smelter is the most economically feasible for use at that smelter.

[50 FR 6448, Feb. 15, 1985, as amended at 51 FR 10211, Mar. 25, 1986]

**§ 57.103 Definitions.**

(a) *The Act* means the Clean Air Act, as amended.

(b) *Active use* refers to an $SO_2$ constant control system installed at a smelter before August 7, 1977 and not totally removed from regular service by that date.

(c) *Adequate $SO_2$* emission limitation means a SIP emission limitation which was approved or promulgated by EPA as adequate to attain and maintain the NAAQS in the areas affected by the stack emissions without the use of any unauthorized dispersion technique.

(d) *Administrative Law Judge* means an administrative law judge appointed under 5 U.S.C. 3105 (see also 5 CFR part 930, as amended by 37 FR 16787), and is synonymous with the term ''Hearing Examiner'' as formerly used in Title 5 of the U.S. Code.

(e) *The Administrator* means the Administrator of the U.S. Environmental Protection Agency, or the Administrator's authorized representative.

(f) *Ambient air* shall have the meaning given by 40 CFR 50.1(e), as that definition appears upon promulgation of this subpart, or as hereafter amended.

(g) *Ambient air quality* refers only to concentrations of sulfur dioxide in the ambient air, unless otherwise specified.

(h) *An approved measure* refers to one contained in an NSO which is in effect.

(i) *Assistant Administrator for Air and Radiation* means the Assistant Administrator for Air and Radiation of the U.S. Environmental Protection Agency.

(j) *Constant controls, control technology, and continuous emission reduction technology* mean systems which limit the quantity, rate, or concentration, excluding the use of dilution, and emissions of air pollutants on a continuous basis.

(k) *Effective date of an NSO* means the effective date listed in the FEDERAL REGISTER publication of EPA's issuance or approval of an NSO.

(l) *EPA and the Agency* means the Administrator of the U.S. Environmental Protection Agency, or the Administrator's authorized representative.

(m) *Fugitive emissions* means any air pollutants emitted to the atmosphere other than from a stack.

(n) *Issuance* of an NSO means the final transmittal of the NSO pursuant to § 57.107(a) by an issuing agency (other than EPA) to EPA for approval, or the publication of an NSO issued by EPA in the FEDERAL REGISTER.

(o) *Issuing agency*, unless otherwise specifically indicated, means the State or local air pollution control agency to which a smelter's owner has applied for an NSO, or which has issued the NSO, or EPA, when the NSO application has been made to EPA. Any showings or demonstrations required to be made under this part to the issuing agency, when not EPA, are subject to independent determinations by EPA.

(p) *Malfunction* means any unanticipated and unavoidable failure of air pollution control equipment or process equipment or of a process to operate in a normal or usual manner. Failures that are caused entirely or in part by poor design, poor maintenance, careless operation, or any other preventable upset condition or preventable equipment breakdown shall not be considered malfunctions. A malfunction exists only for the minimum time necessary to implement corrective measures.

(q) *Maximum production capacity* means either the maximum demonstrated rate at which a smelter has produced its principal metallic final product under the process equipment configuration and operating procedures prevailing on or before August 7, 1977, or a rate which the smelter is able to demonstrate by calculation is attainable with process equipment existing on August 7, 1977. The rate may be expressed as a concentrate feed rate to the smelter.

(r) *NAAQS and National Ambient Air Quality Standards,* unless otherwise specified, refer only to the National Primary and Secondary Ambient Air Quality Standards for sulfur dioxide.

(s) *Scheduled maintenance* means any periodic procedure, necessary to maintain the integrity or reliability of emissions control performance, which can be anticipated and scheduled in advance. In sulfuric acid plants, it includes among other items the screening or replacement of catalyst, the retubing of heat exchangers, and the routine repair and cleaning of gas handling/cleaning equipment.

(t) *Smelter owner and operator* means the owner or operator of the smelter, without distinction.

(u) *Supplementary control system* (SCS) means any technique for limiting the concentration of a pollutant in the ambient air by varying the emissions of that pollutant according to atmospheric conditions. For the purposes of this part, the term supplementary control system does not include any dispersion technique based solely on the use of a stack the height of which exceeds good engineering practice (as determined under regulations implementing section 123 of the Act).

(v) *Unauthorized dispersion technique* refers to any dispersion technique which, under section 123 of the Act and the regulations promulgated pursuant to that section, may not be used to reduce the degree of emission limitation otherwise required in the applicable SIP.

(w) Unless otherwise specified in this part, all terms shall have the same meaning given them by the Act.

[50 FR 6448, Feb. 15, 1985, as amended at 57 FR 5328, Feb. 13, 1992]

## § 57.104 Amendment of the NSO.

An NSO shall be amended whenever necessary for compliance with the requirements and purposes of this part.

(a)(1) *Issuance of amendment.* A State or local issuing agency may issue an amendment of any NSO it has issued. Any amendment issued by a State or local issuing agency shall be subject to approval by EPA to the same extent as was the original NSO. Any smelter owner may apply to the agency which originally issued its NSO for an amendment of the NSO at any time. Such an application shall be accompanied by whatever documentation is required by that agency (or EPA) to support the requested amendment.

(2)(i) Notwithstanding the requirements of paragraph (a)(1) of this section, amendments to SIP compliance schedule interim compliance dates in State-issued NSO's need not be submitted for EPA approval if the amendment does not delay the interim date by more than three months from the date as approved by the Administrator and if the final compliance date is unchanged. Delays longer than 3 months shall be handled according to the provisions of § 57.104(a)(1).

(ii) Changes made in accordance with this subparagraph may be effective immediately but must be submitted to EPA within seven days. EPA will give public notice of receipt of such changes by publication of a Notice in the FEDERAL REGISTER.

(3) In any case in which the issuing agency fails to issue an amendment necessary for compliance with the requirements and purposes of this part, EPA may, after first giving the issuing Agency notice, issue such amendment.

(b) *Revision of SCS Manual.* Operation in accordance with the revised provisions of an SCS operational manual (see § 57.402(e)) shall not be considered a violation of an NSO while the application for approval of those revisions as NSO amendments is pending before the issuing agency (or EPA) for approval: *Provided,* that:

(1) No violations of NAAQS occur in the smelter's Designated Liability Area during that time; and

(2) The smelter operator has not been informed by the issuing agency or EPA that its application is not adequately

documented, unless such deficiency has been remedied promptly.

(c) *Notice and opportunity for hearing.* Notice and opportunity for public hearing shall be provided before issuance of all major amendments.

### § 57.105 Submittal of required plans, proposals, and reports.

(a) The failure of a smelter owner to submit any plan, report, document or proposal as required by its NSO or by this part shall constitute a violation of its NSO.

(b) If the Administrator determines that a nonferrous smelter is in violation of a requirement contained in an NSO approved under these regulations, the Administrator shall, as provided by section 119(f) of the Act:

(1) Enforce such requirement under section 113 (a), (b), or (c) of the Act;

(2) Revoke the order after notice and opportunity for hearing;

(3) Give notice of noncompliance and commence action under section 120 of the act; or

(4) Take any appropriate combinations of these actions.

(c) Under section 304 of the Act, any person may commence a civil action against an owner or operator of a smelter which is alleged to be in violation or any order approved under this part.

### § 57.106 Expiration date.

Each NSO shall state its expiration date. No NSO issued under this regulation shall expire later than January 1, 1988.

### § 57.107 The State or local agency's transmittal to EPA.

(a) *Content and bases of the State or local agency's NSO.* Issuance of an NSO by a State or local agency shall be completed by the issuing agency's transmittal to the appropriate EPA Regional Office of:

(1) The text of the NSO;

(2) The application submitted by the smelter owner, except for appendix A to this part, all correspondence between the issuing agency and the applicant relating to the NSO, and any material submitted in support of the application;

(3) A concise statement of the State or local agency's findings and their bases; and

(4) All documentation or analyses prepared by or for the issuing agency in support of the NSO.

(b) *The State or local agency's enforcement plan.* The transmittal under paragraph (a) of this section shall be accompanied by a description of the issuing agency's plans for monitoring compliance with and enforcement of the NSO. The transmittal shall also include a description of the resources which will be used to implement those plans. If the enforcement plans appear inadequate, EPA may require that the NSO be modified such that the NSO will be adequately enforced.

### § 57.108 Comparable existing SIP provisions.

Notwithstanding any other provision of this part, an NSO may contain provisions to which the affected smelter is subject under the applicable EPA-approved State Implementation Plan (SIP) for sulfur dioxide in lieu of the corresponding provisions which would otherwise be required under this part if the Administrator determines that those SIP provisions are substantially equivalent to the corresponding NSO provisions which would otherwise be required, and if the Administrator determines that the smelter is in substantial compliance with those SIP provisions. For the purposes of this section, provisions to which the affected smelter is subject under the applicable EPA-approved State Implementation Plan are those which became effective before the smelter owner applied for the NSO.

### § 57.109 Maintenance of pay.

The Administrator will not approve or issue an NSO for any smelter unless he has approved or promulgated SIP provisions which are applicable to the smelter and which satisfy the requirements of section 110(a)(6) of the Clean Air Act.

### § 57.110 Reimbursement of State or local agency.

As a condition of issuing an NSO, any issuing agency may require the smelter operator to pay a fee to the State or

local agency sufficient to defray the issuing agency's expenses in issuing and enforcing the NSO.

### § 57.111 Severability of provisions.

The provisions promulgated in this part and the various applications thereof are distinct and severable. If any provision of this part or the application thereof to any person or circumstances is held invalid, such invalidity shall not affect other provisions, or the application of such provisions to other persons or circumstances, which can be given effect without the invalid provision of application.

## Subpart B—The Application and the NSO Process

### § 57.201 Where to apply.

Any eligible smelter may apply for an NSO to the appropriate EPA Regional Office or to the appropriate State or local air pollution control agency.

(a) When application is made to EPA, all parts of the application required to be submitted under this subpart shall be sent directly to the Director, Stationary Source Compliance Division (EN–341), U.S. Environmental Protection Agency, 1200 Pennsylvania Ave., NW., Washington, DC 20460, Attention: Confidential Information Unit. In addition, the smelter owner shall send a copy of the application, except that part required to be submitted under § 57.203(b) (eligibility), directly to the appropriate EPA Regional Office.

(b) When application is made to the appropriate State or local agency, the smelter owner shall submit one complete copy of all parts of the application required to be submitted under this subpart to that agency, in addition to the application requirements contained in paragraph (a) of this section. If the smelter owner is requesting an advance eligibility determination pursuant to § 57.203(b), such request must be made in writing and shall accompany the copy of the application being sent to the Director of the Stationary Source Compliance Division of the Environmental Protection Agency.

(c) If the smelter owner is requesting a waiver of the interim constant control requirement of § 57.301, such request must be sent directly to the Director, Stationary Source Compliance Division, at the time of application, in accordance with § 57.802.

(d) *The NSO Process.* (1) A smelter desiring an NSO shall apply for an NSO by submitting an application under subpart B including the financial information required in appendix A and including the information necessary to make the determinations required by this subparagraph and § 57.201(d)(2). The issuing agency shall analyze the financial information according to the financial eligibility test prescribed by subpart A and described in appendix A. The issuing Agency shall then determine whether the smelter is able to comply with its SIP on or before the date required in the SIP by installing adequately demonstrated technology which is reasonably available. See also § 57.102(a)(3). If the test demonstrates that adequately demonstrated technology is not reasonably available to the smelter to allow it to comply with the SIP by the required compliance date, the smelter is eligible for an NSO.

(2)(i) If the smelter is determined to be eligible for an NSO under paragraph (d)(1) of this section, the issuing Agency shall apply the appendix A financial eligibility tests again before issuing an NSO in order to determine if the smelter can comply with its SIP requirements on or before January 1, 1988 by installing adequately demonstrated technology which is reasonably available.

(ii) If application of the tests shows that the smelter could comply by or before January 1, 1988, the issuing agency shall notify the smelter of this determination, and shall not issue an NSO to the smelter unless the NSO contains a SIP compliance schedule meeting the requirements of § 57.705. Such a compliance schedule must provide for compliance with the smelter's $SO_2$ SIP as expeditiously as practicable and in no case later than January 1, 1988. A smelter must submit to the issuing agency information necessary to determine a compliance schedule meeting the requirements of § 57.705. This information shall be submitted by a smelter within thirty days after the smelter is notified by the issuing agency that a SIP compliance schedule is

required. The Administrator may consider an NSO application to be withdrawn for SIP enforcement purposes if a smelter fails to submit such information within the time required under this paragraph.

(iii) If no adequately demonstrated technology is found to be reasonably available to enable a smelter to comply by January 1, 1988, it would be excused from the compliance schedule requirement in § 57.201(d)(2)(ii), but it would be subject to reevaluation of its ability to comply by that date at any time during the term of the NSO. (See § 57.201(d)(3)).

(3) At any time during the term of an NSO which does not contain a SIP compliance schedule, EPA or the issuing agency may reevaluate the availability of technology to the smelter. If EPA or the issuing agency determines that adequately demonstrated technology is reasonably available to permit the smelter to comply with its SIP by or before January 1, 1988, the NSO shall be amended within 3 months time after such determination. The amendment shall require compliance with all SIP requirements by or before January 1, 1988, and shall include a compliance schedule meeting the requirements of § 57.705. The determination that adequately demonstrated technology is reasonably available shall be made by reapplying the same appendix A financial eligibility tests required by subpart B, updated by economic data reflecting current operating conditions and currently demonstrated control technology. Any such determination and amendment shall be governed by the provisions of this part and section 119 of the Clean Air Act.

(4) Notice and opportunity for public hearing in accordance with section 119 of the Clean Air Act must be provided before issuance of any NSO.

(e) A smelter that does not have any constant $SO_2$ controls or whose existing constant $SO_2$ controls when in full operation and optimally maintained are not sufficient to treat all strong $SO_2$ streams may apply for a waiver of the requirements of subpart C to install interim constant controls by submitting an application under subpart H. A waiver may be granted only with respect to the requirement to eliminate bypass of constant controls through the installation of new constant control equipment, not with respect to the requirements for optimum maintenance and operation of existing equipment. EPA shall then determine the smelter's ability to afford installation of the required additional interim constant $SO_2$ control equipment at the smelter based on financial eligibility information analyzed according to the financial test prescribed in appendix A. A waiver of the requirement for additional interim constant controls will be granted if EPA determines in accordance with the procedures of subpart H that imposition of this requirement would necessitate closure of the smelter for at least one year.

### § 57.202 How to apply.

(a) *Letter of intent.* To initiate an application for an NSO, the owner or operator of a smelter shall send a letter of intent to an appropriate air pollution control agency. The letter of intent shall contain a statement of the owner's intent to apply for an NSO, and an agreement to provide any information required under this part. The letter of intent shall be signed by a corporate official authorized to make such commitments. Upon receipt of any letter of intent by the issuing agency, the SIP emission limitation for sulfur dioxide, as to that applicant, shall be deemed suspended for 60 days. The 60 day suspension may be extended for good cause at the discretion of the Administrator.

(b) *Complete application.* (1) Within the period referred to in paragraph (a) of this section, the smelter owner shall submit its completed application pursuant to § 57.201. Receipt of all parts of a substantially complete application postmarked within the original or extended application period shall be deemed to continue the suspension of the SIP emission limitation for $SO_2$ until the issuing agency issues or declines to issue an NSO. This suspension shall in all cases terminate, however, 90 days after receipt of the substantially completed application, unless extended for good cause at the discretion of the Administrator. If, in the Administrator's judgment, good faith effort

has been made to submit a complete application, additional time may be granted to allow for correction of minor deficiencies.

(2) If an issuing agency transmits an NSO to EPA for approval before the expiration of the suspension of the Federal SIP emission limitation, the suspension shall continue until EPA approves or disapproves the NSO.

**§ 57.203 Contents of the application.**

(a) *Claim of confidentiality*. The smelter owner may make a business confidentiality claim covering all or part of the information in the NSO application in accordance with 40 CFR part 2, subpart B (41 FR 36906 *et seq*., Sept. 1, 1976 as amended by 43 FR 39997 *et seq*., Sept. 8, 1978). A claim is effective only if it is made at the time the material is submitted to the issuing agency or EPA. A claim shall be made by attaching to the information a notice of confidentiality. Information claimed as confidential will be handled by EPA under the provisions of 40 CFR part 2, subpart B. If no claim accompanies the information, it may be made available to the public without further notice.

(b) Each smelter owner shall make the showing required by § 57.102(a)(3) by completing and submitting appendix A to this part and any necessary supplemental information to the issuing agency as a part of its application. Each smelter shall also submit as part of its application the information which, in conjunction with the information required by appendix A, is necessary for the issuing agency to make the determination required by § 57.201(d)(2). Any smelter owner or State may, at its option, simultaneously submit this material to EPA for an advance eligibility determination.

(c) *Current operating information*. A complete NSO application shall also contain the following information:

(1) A process flow diagram of the smelter, including current process and instrumentation diagrams for all processes or equipment which may emit or affect the emission of sulfur dioxide; the characteristics of all gas streams emitted from the smelter's process equipment (flow rates, temperature, volumes, compositions, and variations over time); and a list of all monitoring data and strip charts, including all data, charts, logs or sheets kept with respect to the operation of any process equipment which may emit or affect the emission of sulfur dioxide;

(2) The smelter's maximum daily production capacity (as defined in § 57.103(r)), the operational rate (in pounds of concentrate charged to the smelting furnace per hour) of each major piece of process equipment when the smelter is operating at that capacity; and the smelter's average and maximum daily production rate for each product, co-product, or by-product, by year, for the past four years;

(3) The optimal conversion efficiency (defined in terms of percent of total $SO_2$ removed from the input flow stream) of any acid plant or other sulfur dioxide control system under the normal process operating conditions (excluding malfunctions) most conducive to optimal conversion efficiency;

(4) The average conversion efficiency of any acid plant or other sulfur dioxide control system during normal process operations (excluding malfunctions), by month, during the past four years.

(5) The percent of the time the acid plant or other control system was available for service during each month for the past four years, excluding downtime for scheduled maintenance, and a full explanation of any major or recurring problems with the system during that time;

(6) The frequency and duration of times during the past four years when the $SO_2$ system was unavailable because of scheduled maintenance of the system;

(7) A description of all scheduled, periodic, shutdowns of the smelter during the past four years, including their purpose, frequency and duration; and the same information with respect to unscheduled shutdowns;

(8) The gas volume, rates, and $SO_2$ concentration which the control system was actually designed to accommodate, taking into account any modifications made after its installation;

(9) The average monthly sulfur balance across the process and control equipment, including fugitive emissions, for the past 4 years; and

(10) A description of engineering techniques now in use at the smelter to prevent the release of fugitive emissions into the atmosphere at low elevations.

(d) *The smelter owner's proposals.* The smelter owner shall submit as part of its application, draft NSO provisions which would implement the requirements of subparts C through G of this part. The issuing agency may use these proposals as the basis for any NSO that may be granted, or may modify these proposals in any way it deems necessary in order to comply with the requirements of this part.

(e) A smelter may submit as part of its application, information necessary to determine any SIP compliance schedule which might be required under § 57.201(d)(2).

(f) *Additional information.* The smelter owner shall designate in its application a corporate officer responsible and authorized to supply supplemental technical and economic information and explanations as required by the issuing agency during the formulation of the NSO. Failure to supply such information and explanations shall constitute a failure to submit a complete application.

(g) *Request for a waiver of constant controls.* Any request for a waiver of the requirement interim constant control of all strpmg streams of § 57.301 shall be made in accordance with § 57.802. The criteria and procedures for granting the waiver are governed by subpart H of this part.

(h) Unless a smelter applies for a waiver in accordance with subpart H, a smelter shall submit as part of its application a proposed schedule for compliance with the interim constant control requirements of subpart C which satisfies the requirements of § 57.702.

### § 57.204 EPA action on second period NSOs which have already been issued.

(a) EPA may approve a second period NSO issued by a State before the date of publication of these regulations in the FEDERAL REGISTER, without requiring a complete reapplication under this subpart and new State proceedings, provided:

(1) The second period NSO was issued by the State consistent with the procedural requirements of section 119 of the Clean Air Act;

(2) EPA can make a determination that the smelter is eligible for a second period NSO and whether the smelter can comply with its $SO_2$ SIP limits on or before January 1, 1988 under the financial eligibility tests in these regulations on the basis of available information and such supplementary information as the Agency may request the smelter to submit; and

(3) The provisions of the NSO are consistent with the requirements of these regulations.

(b) Should EPA require a smelter to submit information before taking final action on an NSO referred to in paragraph (a), of this section, it shall specify a reasonable period for submission of such information in light of the nature of the information being required. The duration of such period shall not exceed the period allowed for submission of a complete application under § 57.202 (a) and (b).

(c) The Agency shall consider the SIP emission limitation for $SO_2$ to be suspended with respect to a smelter which received an NSO described in subpart A until EPA takes final action on such NSO. Such suspension shall terminate if the smelter does not submit supplementary information within the time specified under paragraph (b).

### § 57.205 Submission of supplementary information upon relaxation of an $SO_2$ SIP emission limitation.

(a) In the event an $SO_2$ SIP limit is relaxed subsequent to EPA approval or issuance of a second period NSO, the smelter issued the NSO shall submit to the issuing agency and EPA such supplementary information that EPA considers appropriate for purposes of determining whether the means of compliance with the new SIP limit are adequately demonstrated to be reasonably available under the financial eligibility tests specified in § 57.102(b)(3). The smelter shall submit such information within sixty days of notification by EPA. This time limit may be extended by EPA for good cause.

(b) Upon receipt of any supplementary information required under

paragraph (a), the issuing agency shall promptly reevaluate the availability of the means of compliance with the new SIP limit under the NSO eligibility tests specified in § 57.102(b)(3). If the issuing agency determines that the demonstrated control technology necessary to attain the new $SO_2$ SIP limit is adequately demonstrated to be reasonably available under the eligibility tests, so as to permit the smelter to comply with the new SIP limit on or before January 1, 1988, the NSO shall be amended within the time contemplated by § 57.202(a) after receipt of the supplementary information. Such amendment shall require compliance with the new $SO_2$ SIP limit as expeditiously as practicable in accordance with § 57.201(d)(3). The issuing agency, if not EPA, shall promptly submit its determination and any necessary NSO amendments to EPA.

(c) EPA shall take action to approve or disapprove the issuing agency's determination and NSO amendment, if any, within a reasonable time after receipt of such determination and amendment.

(d) If EPA disapproves the issuing agency's determination or NSO amendment, or if a smelter fails to submit any supplementary information as required under paragraph (a), EPA and/or the issuing agency shall take appropriate remedial action. EPA shall take appropriate remedial action if the issuing agency does not make any determination and amendment required by this section within the time contemplated by § 57.202(a).

## Subpart C—Constant Controls and Related Requirements

### § 57.301 General requirements.

Each NSO shall require an interim level of sulfur dioxide constant controls to be operated at the smelter, unless a waiver of this requirement has been granted to the owner under subpart H of this part. Except as otherwise provided in § 57.304, the interim constant controls shall be properly operated and maintained at all times. The NSO shall require the following gas streams to be treated by interim constant controls:

(a) In copper smelters, off-gases from fluidized bed roasters, flash furnaces, NORANDA reactors, electric furnaces and copper converters;

(b) In lead smelters, off-gases from the front end of the sintering machine and any other sinter gases which are recirculated;

(c) In zinc smelters, off-gases from mult-hearth roasters, flash roasters and fluidized bed roasters; and

(d) In all primary nonferrous smelters, all other strong $SO_2$ streams.

(e) In all primary nonferrous smelters, any other process streams which were regularly or intermittently treated by constant controls at the smelter as of August 7, 1977.

### § 57.302 Performance level of interim constant controls.

(a) *Maximum feasible efficiency*. Each NSO shall require: that the smelter operate its interim constant control systems at their maximum feasible efficiency, including the making of any improvements necessary to correct the effects of any serious deficiencies; that the process and control equipment be maintained in the way best designed to ensure such operation; and that process operations be scheduled and coordinated to facilitate treatment of process gas streams to the maximum possible extent. Maximum feasible efficiency shall be expressed in the NSO in the form of a limitation on the concentration of $SO_2$ in the tail gas of each individual control system in combination with an appropriate averaging period, as provided below in paragraphs (b) and (c) of this section.

(b) *The limitation level for $SO_2$ concentration in the control system tail gas*. The level at which the concentration limitation is set shall take into account fluctuations in the strength and volume of process off-gases to the extent that those fluctuations affect the $SO_2$ content of the tail gas and cannot be avoided by improved scheduling and coordination of process operations. The limitation shall exclude the effect of any increase in emissions caused by process or control equipment malfunction. The limitation shall take into account unavoidable catalyst deterioration in sulfuric acid plants, but may prescribe the frequency of catalyst

screening or replacement. The NSO shall also prohibit the smelter owner from using dilution air to meet the limitation.

(c) *Averaging period.* (1) The averaging period shall be derived in combination with the concentration limitation and shall take into account the same factors described in paragraph (b). The averaging period established under this paragraph should generally not exceed the following:

(i) For sulfuric acid plants on copper smelters, 12-hour running average;

(ii) For sulfuric acid plants on lead smelters, 6-hour running average;

(iii) For sulfuric acid plants on zinc smelters, 2-hour running average;

(iv) For dimethylaniline (DMA) scrubbing units on copper smelters, 2-hour running average.

(2) A different averaging period may be established if the applicant demonstrates that such a period is necessary in order to account for the factors described in paragraph (b) of this section: Provided, that the period is enforceable and satisfies the criteria of paragraph (a) of this section.

(d) *Improved performance.* (1) The performance level representing maximum feasible efficiency for any existing control system (e.g., a sulfuric acid plant or a DMA scrubber) shall require the correction of the effects of any serious deficiencies in the system. For the purpose of this paragraph, at least the following problems shall constitute serious deficiencies in acid plants:

(i) Heat exchangers and associated equipment inadequate to sustain efficient, autothermal operation at the average gas strengths and volumes received by the acid plant during routine process equipment operation;

(ii) Failure to completely fill all available catalyst bed stages with sufficient catalyst;

(iii) Inability of the gas pre-treatment system to prevent unduly frequent plugging or fouling (deterioration) of catalyst or other components of the acid plant; or

(iv) Blower capacity inadequate to permit the treatment of the full volume of gas which the plant could otherwise accommodate, or in-leakage of air into the flues leading to the plant, to the extent that this inadequacy results in bypassing of gas around the plant.

(2) Notwithstanding any contrary provisions of § 57.304(c) (malfunction demonstration), no excess emissions (as defined in § 57.304(a)) shall be considered to have resulted from a malfunction in the constant control system if the smelter owner has not upgraded serious deficiencies in the constant control system in compliance with the requirements of § 57.302(d)(1), unless the smelter owner demonstrates under § 57.304(c) that compliance with those requirements would not have affected the magnitude of the emission.

(e) *Multiple control devices.* (1) At any smelter where off-gas streams are treated by various existing control systems (e.g., multiple acid plants or a DMA scrubber and an acid plant), the NSO shall require the use of those systems in the combination that will result in the maximum feasible net $SO_2$ removal.

(2) To the extent that compliance with this requirement is demonstrated by the smelter operator to result in excess emissions during unavoidable start up and shut down of the control systems, those excess emissions shall not constitute violations of the NSO.

### § 57.303 Total plantwide emission limitation.

(a) *Calculation of the emission limitation.* Each NSO shall contain a requirement limiting the total allowable emissions from the smelter to the level which would have been associated with production at the smelter's maximum production capacity (as defined in § 57.103(r)) as of August 7, 1977. This limitation shall be expressed in units of mass per time and shall be calculated as the sum of uncontrolled process and fugitive emissions, and emissions from any control systems (operating at the efficiency prescribed under § 57.302). These emission rates may be derived from either direct measurements or appropriately documented mass balance calculations.

(b) *Compliance with the emission limitation.* Each NSO shall require the use of specific, enforceable testing methods and measurement periods for determining compliance with the limitation

established under paragraph (a) of this section.

### § 57.304 Bypass, excess emissions and malfunctions.

(a) *Definition of excess emissions.* For the purposes of this subpart, any emissions greater than those permitted by the NSO provisions established under § 57.302 (performance level of interim constant controls) or § 57.303 (plantwide emission limitation) of this subpart shall constitute excess emissions. Emission of any gas stream identified under § 57.301 (a), (b), (c), (d) or (e) of this subpart that is not treated by a sulfur dioxide constant control system shall also constitute an excess emission under this subpart.

(b) *The excess emission report.* Each NSO shall require the smelter to report all excess emissions to the issuing agency, as provided in § 57.305(b). The report shall include the following:

(1) Identity of the stack or other emission points where the excess emissions occurred;

(2) Magnitude of the excess emissions expressed in the units of each applicable emission limitation, as well as the operating data, documents, and calculations used in determining the magnitude of the excess emissions;

(3) Time and duration of the excess emissions;

(4) Identity of the equipment causing the excess emissions;

(5) Nature and cause of such excess emissions;

(6) Steps taken to limit the excess emissions, and when those steps were commenced;

(7) If the excess emissions were the result of a malfunction, the steps taken to remedy the malfunction and to prevent the recurrence of such malfunction; and

(8) At the smelter owner's election, the demonstration specified in paragraph (c) of this section.

(c) *Malfunction demonstration.* Except as provided in § 57.302(e)(2) or in paragraph (d) or (e) of this section, any excess emission shall be a violation of the NSO unless the owner demonstrates in the excess emissions report required under paragraph (b) of this section that the excess emission resulted from a malfunction (or an unavoidable start up and shut down resulting from a malfunction) and that:

(1) The air pollution control systems, process equipment, or processes were at all times maintained and operated, to the maximum extent practicable, in a manner consistent with good practice for minimizing emissions;

(2) Repairs were made as expeditiously as practicable, including the use of off-shift labor and overtime;

(3) The amount and duration of the excess emissions were minimized to the maximum extent practicable during periods of such emissions; and

(4) The excess emissions were not part of a recurring pattern indicative of serious deficiencies in, or inadequate operation, design, or maintenance of, the process or control equipment.

(d) *Scheduled maintenance exception.* Excess emissions occurring during scheduled maintenance shall not constitute violations of the NSO to the extent that:

(1) The expected additional annual sulfur dioxide removal by any control system (including associated process changes) for which construction had not commenced (as defined in 40 CFR 60.2 (g) and (i)) as of August 7, 1977 and which the smelter owner agrees to install and operate under subpart F, would have offset such excess emissions if the system had been in operation throughout the year in which the maintenance was performed;

(2) The system is installed and operated as provided in the NSO provisions established under subpart F; and

(3) The system performs at substantially the expected efficiency and reliability subsequent to its initial break-in period.

(e) An NSO may provide that excess emissions which occur during acid plant start-up as the result of the cooling of acid plant catalyst due to the unavailability of process gas to an acid plant during a prolonged SCS curtailment or scheduled maintenance are not excess emissions. If the NSO does so provide, it shall also require the use of techniques or practices designed to minimize these excess emissions, such as the sealing of the acid plant during prolonged curtailments, the use of auxiliary heat or $SO_2$ injected during the curtailment, or the preheating of the

acid plant before start-up of the process equipment it serves.

(f) Requirements for a smelter with constant controls that applies for a waiver.

(1) If a smelter that has some interim constant controls applies for a waiver in accordance with subpart H, the following requirements shall apply pending action on the waiver application and following final action granting or approving a waiver:

(i) The NSO shall require the smelter to implement maintenance and operation measures designed to reduce to the maximum extent feasible the potential for bypass of existing interim constant controls.

(ii) Upon application for a waiver under subpart H, the smelter shall submit to the issuing agency for its approval and to EPA proposed maintenance and operation measures for compliance with the requirements of paragraph (i).

(iii) The remainder of this subpart shall apply except that: (A) The emission limitations required under this subpart shall be based only on existing constant control equipment as upgraded through the improved maintenance and operation required by this paragraph, and (B) bypass of existing controls shall not constitute excess emissions, provided the maintenance and operation requirements and emission limitations prescribed by the NSO are satisfied.

(2) After any denial of a waiver by the issuing Agency, or any disapproval by EPA of a waiver granted by the issuing agency, the NSO shall be amended consistent with the requirements of this subpart and § 57.702.

### § 57.305 Compliance monitoring and reporting.

(a) *Monitoring*. (1) Each NSO shall require compliance with the control system performance requirements established pursuant to this subpart to be determined through the use of continuous monitors for measuring $SO_2$ concentration.

(i) Such monitors must be installed, operated and maintained in accordance with the performance specifications and other requirements contained in appendix D to 40 CFR part 52 or part 60. The monitors must take and record at least one measurement of $SO_2$ concentration from the effluent of each control system in each 15-minute period. Failure of the monitors to record at least 95% of the 15-minute periods in any 30-day period shall constitute a violation of the NSO.

(ii) The sampling point shall be located at least 8 stack diameters (diameter measured at sampling point) downstream and 2 diameters upstream from any flow disturbance such as a bend, expansion, constriction, or flame, unless another location is approved by the Administrator.

(iii) The sampling point for monitoring emissions shall be in the duct at the centroid of the cross section if the cross sectional area is less than 4.645$m^2$ (50 $ft^2$) or at a point no closer to the wall than 0.914m (3 ft) if the cross sectional area is 4.645$m^2$ (50 $ft^2$) or more. The monitor sample point shall be in an area of small spatial concentration gradient and shall be representative of the concentration in the duct.

(iv) The measurement system(s) installed and used pursuant to this paragraph shall be subject to the manufacturer's recommended zero adjustment and calibration procedures at least once per 24-hour operating period unless the manufacturer specifies or recommends calibration at shorter intervals, in which case such specifications or recommendations shall be followed. Records of these procedures shall be made which clearly show instrument readings before and after zero adjustment and calibration.

(2) Each NSO shall require the monitoring of any ducts or flues used to bypass gases, required under this subpart to be treated by constant controls, around the smelter's sulfur dioxide constant control system(s) for ultimate discharge to the atmosphere. Such monitoring shall be adequate to disclose the time of the bypass, its duration, and the approximate volume and $SO_2$ concentration of gas bypassed.

(b) *Reporting*. (1) Each NSO shall require that the smelter maintain a record of all measurements required under paragraph (a) of this section. Results shall be summarized monthly and shall be submitted to the issuing agency within 15 days after the end of each

month. The smelter owner shall retain a record of such measurements for one year after the NSO period terminates.

(2) Each NSO shall require that the smelter maintain a record of all measurements and calculations required under § 57.303(b). Results shall be summarized on a monthly basis and shall be submitted to the issuing agency at 6-month intervals. The smelter owner shall retain a record of such measurements and calculations for at least one year after the NSO terminates.

(3) The report required under § 57.304(b) shall accompany the report required under paragraph (b)(1) of this section.

(c) *Quality assurance and continuous data*—(1) *Quality assurance.* Each NSO shall require that the smelter submit a plan for quality assurance to the issuing agency for approval and that all monitoring performed by continuous monitors shall be verified for quality assurance by the smelter. Such plans must follow current EPA guidelines for quality assurance, in order to be approvable.

(2) *Continuous data.* Manual source testing methods equivalent to 40 CFR part 60, appendix A shall be used to determine compliance if the continuous monitoring system malfunctions.

## Subpart D—Supplementary Control System Requirements

### § 57.401 General requirements.

Except as provided in subpart E, each NSO shall require the smelter owner to prevent all violations of the NAAQS in the smelter's designated liability area (DLA) through the operation of an approved supplementary control system (SCS).

### § 57.402 Elements of the supplementary control system.

Each supplementary control system shall contain the following elements:

(a) *Air quality monitoring network.* An approvable SCS shall include the use of appropriate ambient air quality monitors to continuously measure the concentration of sulfur dioxide in the air in the smelter's DLA.

(1) The monitors shall be located at all points of expected $SO_2$ concentrations necessary to anticipate and prevent possible violations of NAAQS anywhere in the smelter's DLA. The determination of the locations where such concentrations may occur shall take into account all recorded or probable meteorological and operating conditions (including bypassing of control equipment), as well as the presence of other sources of $SO_2$ significantly affecting $SO_2$ concentrations in the DLA.

(2) The number and location of sites shall be based on dispersion modeling, measured ambient air quality data, meteorological information, and the results of the continuing review required by paragraph (f) of this section. The system shall include the use of at least 7 fixed monitors unless the issuing agency determines, on the basis of a demonstration by the smelter owner, that the use of fewer monitors would not limit coverage of points of high $SO_2$ concentration or otherwise reduce the capability of the smelter owner to prevent any violations of the NAAQS in the smelter's DLA.

(3) All monitors shall be continuously operated and maintained and shall meet the performance specifications contained in 40 CFR part 53. The monitors shall be capable of routine real time measurement of maximum expected $SO_2$ concentrations for the averaging times of $SO_2$ NAAQS.

(b) *Meteorological network.* The SCS must have a meteorological assessment capability adequate to predict and identify local conditions requiring emission curtailment to prevent possible violations of the NAAQS. The meteorological assessment capability shall provide all forecast and current information necessary for successful use of the SCS operational manual required by paragraph (e) of this section.

(c) *Designated liability area.* The system shall be required to prevent all violations of the NAAQS within the smelter's DLA. The DLA of any smelter is the area within which the smelter's emissions may cause or significantly contribute to violations of the NAAQS for $SO_2$ when the smelter is operating at its maximum production capacity under any recorded or probable meterological conditions. The boundaries of that area shall be specified in the NSO.

(1) Unless an acceptable demonstration is made under paragraph (c)(2) of this section, the DLA shall be a circle with a center point at the smelter's tallest stack and a minimum radius as given in the following table:

RADIUS FOR $SO_2$ EMISSIONS AT MAXIMUM PRODUCTION CAPACITY [1]

| Emissions rate in tons per hour | Emission rate in grains per sec. | Radius in kilometers |
|---|---|---|
| 16 or less | 4,000 or less | 11 |
| 24 | 6,000 | 16 |
| 32 | 8,000 | 24 |
| 40 | 10,000 | 32 |
| 48 or more | 12,000 or more | 40 |

[1] Maximum emission rates for periods not to exceed 24 hours. Minimum radii may be determined from the table by linear interpolation.

(2) The NSO may provide for a DLA with different boundaries if the smelter owner can demonstrate through the use of appropriate dispersion modeling and ambient air quality monitoring data that the smelter's controlled emissions could not cause or significantly contribute to a violation of the NAAQS beyond the boundaries of such a different area under any recorded or probable meteorological conditions.

(3) A violation of the NAAQS in the DLA of any smelter shall constitute a violation of that smelter's NSO, unless the issuing agency determines on the basis of a showing by the smelter owner that the smelter owner had taken all emission curtailment action indicated by the SCS operational manual and that the violation was caused in significant part by:

(i) Emissions of another source(s) which were in excess of the maximum permissible emissions applicable to such source(s),

(ii) Fugitive emissions of another source(s), or

(iii) The smelter's own fugitive emissions: *Provided*, that the smelter is in compliance with all requirements of or under subpart E of this part.

(4) For the purposes of this section, maximum permissible emissions for other sources are the highest of:

(i) SIP emission limitation;

(ii) Orders in effect under section 113(d) of the Clean Air Act; or

(d) *Overlapping designated liability areas*. Notwithstanding any other provisions of this subpart, the following requirements shall apply whenever the designated liability areas of 2 or more smelters do, or may, overlap:

(1) In the case of any NSO applicant that would have a DLA which would overlap with the DLA of any other smelter that has applied for an NSO or has an NSO in effect, the NSO applicant shall include in its application an enforceable joint plan, agreed to by such other smelter(s). In determining whether a joint plan is required, the NSO applicant shall calculate its DLA according to the table in paragraph (c)(1) of this section. The DLA of the other smelter shall be calculated according to the table in paragraph (c)(1) unless the other smelter has an NSO in effect, in which case the boundaries in that NSO shall be used. The enforceable joint plan shall provide for:

(i) Emission curtailment adequate to ensure that the NAAQS will not be violated in any areas of overlapping DLAs; and

(ii) Conclusive prospective allocation of legal liability in the event that the NAAQS are violated in the area of overlapping DLAs.

Such plans may, but need not, include the operation of a joint SCS system. Each NSO shall require adherence by the NSO applicant owner to the joint plan for emission curtailment and allocation of liability, unless the issuing agency determines, pursuant to the provisions of paragraph (c)(2) of this section, that the NSO applicant's DLA does not overlap with that of any other smelter.

(2) In the case of any NSO applicant that would have a DLA which would overlap with the DLA of any other smelter whose owner has not applied for an NSO (and does not have an NSO in effect), the NSO applicant's submittal shall contain a written consent, signed by a corporate official empowered to do so. The consent shall state that if, at any time thereafter, the owner of the other smelter applies for an NSO, and the other smelter's DLA would overlap with the NSO applicant's DLA, the NSO applicant will negotiate and submit an enforceable joint plan

for emission curtailment and allocation of liability (as described in paragraph (d)(1) of this section). In determining whether it is necessary to submit such a consent, each smelter's DLA shall be calculated according to the table set forth in paragraph (c)(1) of this section. The consent shall state that a joint plan shall be submitted within 90 days of the issuing agency's notification to the NSO applicant of receipt of the other smelter's letter of intent, unless the issuing agency determines that the DLAs do not overlap. Failure of the NSO applicant to submit such a plan shall constitute grounds for denial of its NSO application or a violation of an effective NSO, as applicable.

(e) *The SCS operational manual.* Each NSO shall require the smelter to be operated in accordance with the provisions of an SCS operational manual approved by the issuing agency. The SCS operational manual shall describe the circumstances under which, the extent to which, and the procedures through which emissions shall be curtailed to prevent violations of the NAAQS in the smelter's DLA. Failure to curtail emissions when and as much as indicated by the manual or to follow the provisions of the manual implementing the requirements of paragraph (e)(3) of this section shall constitute a violation of the NSO.

(1) The operational manual shall prescribe emission curtailment decisions based on the use of real time information from the air quality monitoring network dispersion model estimates of the effect of emissions on air quality, and meteorological observations and predictions.

(2) The operational manual shall also provide for emission curtailment to prevent violation of the NAAQS within the smelter's DLA which may be caused in part by stack emissions, and to the extent practicable fugitive emissions, from any other source (unless that other source is a smelter subject to an NSO).

(3) The SCS operational manual shall include (but not be limited to):

(i) A clear delineation of the authority of the SCS operator to require all other smelter personnel to implement the operator's curtailment decisions;

(ii) The maintenance and calibration procedures and schedules for all SCS equipment;

(iii) A description of the procedures to be followed for the regular acquisition of all meteorological information necessary to operate the system;

(iv) The ambient concentrations and meteorological conditions that will be used as criteria for determining the need for various degrees of emission curtailment;

(v) The meteorological variables as to which judgments may be made in applying the criteria stated pursuant to paragraph (e)(3)(iv) of this section;

(vi) The procedures through which and the maximum time period within which a curtailment decision will be made and implemented by the SCS operator;

(vii) The method for immediately evaluating the adequacy of a particular curtailment decision, including the factors to be considered in that evaluation;

(viii) The procedures through which and the time within which additional necessary curtailment will immediately be effected; and

(ix) The procedures to be followed to protect the NAAQS in the event of a mechanical failure in any element of the SCS.

(f) *Continuing review and improvement of the SCS.* Each NSO shall require the smelter owner to conduct an active program to continuously review the design and operation of the SCS to determine what measures may be available for improving the performance of the system. Among the elements of this program shall be measures to locate and examine possible places both inside and outside the DLA where unmonitored NAAQS violations may be occurring. Such measures shall include the use of modeling as appropriate and mobile ambient air quality monitors, following up on information and complaints from members of the public, and other appropriate activities. The NSO shall also require the submission of a semi-annual report to the issuing agency detailing the results of this review and specifying measures implemented to prevent the recurrence of any violations of NAAQS.

### § 57.403 Written consent.

(a) *The consent.* The NSO shall include a written consent, signed by a corporate official empowered to do so, in the following form:

As a condition of receiving a Primary Nonferrous Smelter Order (NSO) under Section 119 of the Clean Air Act, for the smelter operated by (name of company) at (location), the undersigned official, being empowered to do so, consents for the company as follows:

(1) In any civil proceeding (judicial or administrative) to enforce the NSO, the company will not contest:

(a) Liability for any violation of the National Ambient Air Quality Standards for sulfur dioxide in the smelter's designated liability area (DLA), except on the ground that a determination under 40 CFR 57.402(c)(3) was clearly wrong; or

(b) The conclusive allocation of liability under NSO provisions satisfying 40 CFR 57.402(d)(1) between the company's smelter and any other smelter(s) for any violation of the National Ambient Air Quality Standards for sulfur dioxide in an area of overlapping DLAs.

(2) The issuing agency (as defined in 40 CFR 57.103) will be allowed unrestricted access at reasonable times to inspect, verify calibration of, and obtain data from ambient air quality monitors operated by the company under the requirements of the NSO.

(b) *Rights not waived by the consent.* This consent shall not be deemed to waive any right(s) to judicial review of any provisions of an NSO that are otherwise available to the smelter owner or operator under section 307(b) of the Clean Air Act.

### § 57.404 Measurements, records, and reports.

(a) *Measurements.* Each NSO shall require the smelter owner to install, operate, and maintain a measurement system(s) for continuously monitoring sulfur dioxide emissions and stack gas volumetric flow rates in each stack (except a stack used exclusively for bypassing control equipment) which could emit 5 percent or more of the smelter's total potential (uncontrolled) hourly sulfur dioxide emissions.

(1) Such monitors shall be installed, operated, and maintained in accordance with the performance specifications and other requirements contained in appendices D and E to 40 CFR part 52. The monitors must take and record at least one measurement of sulfur dioxide concentration and stack gas flow rate from the effluent of each affected stack in each fifteen-minute period. (The NSO shall require the smelter operator to devise and implement any procedures necessary for compliance with these performance specifications.)

(2) The sampling point shall be located at least eight stack diameters (diameter measured at sampling point) downstream and two diameters upstream from any flow disturbance such as a bend, expansion, constriction, or flame, unless another location is approved by the Administrator.

(3) The sampling point for monitoring emissions shall be in the duct at the centroid of the cross section if the cross sectional area is less than 4.645 $m^2$ (50 $ft^2$) or at a point no closer to the wall than 0.914m (3 ft) if the cross sectional area is 4.645 $m^2$ (50 $ft^2$) or more. The monitor sample point shall be in an area of small spatial concentration gradient and shall provide a sample which is representative of the concentration in the duct.

(4) The measurement system(s) installed and used pursuant to this paragraph shall be subject to the manufacturer's recommended zero adjustment and calibration procedures at least once per 24-hour operating period unless the manufacturer specifies or recommends calibration at shorter intervals, in which case such specifications or recommendations shall be followed. Records of these procedures shall be made which clearly show instrument readings before and after zero adjustment and calibration.

(5) The results of such monitoring, calibration, and maintenance shall be submitted in the form and with the frequency specified in the NSO.

(b) *Records.* Each NSO shall require the smelter owner to maintain records of the air quality measurements made, meteorological information acquired, emission curtailment ordered (including the identity of the persons making such decisions), and calibration and maintenance performed on SCS monitors during the operation of the SCS. These records shall be maintained for the duration of the NSO.

(c) *Reports.* Each NSO shall require the smelter owner to:

(1) Submit a monthly summary indicating all places and times at which the NAAQS for $SO_2$ were violated in the smelter's DLA, and stating the $SO_2$ concentrations at such times;

(2) Immediately notify EPA and the State agency any time concentrations of $SO_2$ in the ambient air in the smelter's DLA reaches 0.3 part per million (800 micrograms/cubic meter), 24-hour average, or exceed the warning stage in any more stringent emergency plan in the applicable State Implementation Plan; and

(3) Make such other reports as may be specified in the NSO.

**§ 57.405 Formulation, approval, and implementation of requirements.**

(a) *SCS content of the application*. The requirements of § 57.203(d) shall be satisfied with respect to this subpart as follows:

(1) Each NSO application shall include a complete description of any supplementary control system in operation at the smelter at the time of application and a copy of any SCS operational manual in use with that system.

(2) Each NSO application shall contain proposed NSO provisions for compliance with the requirements of §§ 57.401, 57.402 (c), (d), and (f), 57.403, 57.404, and 57.405 (b)(2).

(3) Each NSO application shall include a specific plan for the development of a system fulfilling the requirements of § 57.402(a), (b), and (e) (covering air quality monitoring network, meteorological network, and the SCS operational manual).

(b) *SCS content of the order*. (1) Each NSO shall include an approved version of the plan described in paragraph (a)(3) of this section and shall provide increments of progress towards its completion. Each NSO shall require, upon completion of the measures specified in the approved plan, submission of a report which describes each element of the SCS and explains why the elements satisfy the requirements of the plan and submission of a copy of the SCS operational manual developed under the plan.

(2) Each NSO shall require the submission of a final report, within 6 months of the required date for completion of the measures specified in the approved plan evaluating the performance and adequacy of the SCS developed pursuant to the approved plan. The report shall include:

(i) A detailed description of how the criteria that form the basis for particular curtailment decisions were derived;

(ii) A complete description of each SCS element listed in § 57.402 (a) through (d) (covering monitoring, meteorology, and the DLA), and an explanation of why the elements fulfill the requirements of those sections;

(iii) A reliability study demonstrating that the SCS will prevent violations of the NAAQS in the smelter's DLA at all times. The reliability study shall include a comprehensive analysis of the system's operation during one or more three-month seasonal periods when meteorological conditions creating the most serious risk of NAAQS violations are likely to occur. Where it is impossible, because of time restraints, to include in such a study and analysis of the three month seasonal period with meteorological conditions creating the most serious risk of NAAQS violations, the study shall analyze the system's operation on the basis of all available information. The NSO shall provide that in such case, a supplemental reliability study shall be submitted after the end of the worst case three-month period as a part of the next semi-annual report required under § 57.402(f).

(iv) A copy of the current SCS operational manual.

(c) *Amendment of the NSO*. Each NSO shall be amended, if necessary, within 3 months of completion of the measures required under the SCS development plan and also, if necessary, within three months of submission of the final report or any supplement to the final report required under paragraph (b)(2) of this section, to reflect the most current approved elements of the SCS and, as appropriate, to fulfill all other requirements of this subpart. Each NSO shall also be subsequently amended (as provided in § 57.104) whenever necessary as a result of the program required by § 57.402(f) or to reflect improved SCS operating procedures or other system requirements.

## Subpart E—Fugitive Emission Evaluation and Control

### § 57.501 General requirements.

(a) Each NSO shall require the smelter owner to use such control measures as may be necessary to ensure that the smelter's fugitive emissions do not result in violations of the NAAQS for $SO_2$ in the smelter's DLA.

(b) A smelter which is operating under an NSO containing a SIP compliance schedule established in accordance with § 57.705 is required to be making progress toward compliance with any fugitive control requirements contained in its respective SIP and need not meet the other requirements contained in this subpart.

(c) A smelter which is subject to an NSO which does not contain a SIP compliance schedule must meet the provisions of §§ 57.502 and 57.503.

### § 57.502 Evaluation.

(a) *Evaluation at the time of application.* Any smelter owner may demonstrate at the time of application for an NSO that the smelter's $SO_2$ fugitive emissions will not cause or significant contribute to violations of the NAAQS in the smelter's DLA. If such demonstration is not made, the smelter owner shall submit the design and workplan for a study adequate to assess the sources of significant fugitive emissions from the smelter and their effects upon ambient air quality.

(b) Evaluation during the first 6 months of the NSO. The design and workplan of the study shall be approved, if adequate, by the issuing agency and included in the NSO. The study shall commence no later than the date when the NSO becomes effective and an analysis of its results shall be submitted to the issuing agency within 6 months of the effective date of the NSO. The study shall include an appropriate period during which the ambient air shall be monitored to determine the impact of fugitive emissions of sulfur dioxide, arsenic (at copper smelters only), lead (at lead and zinc smelters only), and total suspended particulates on the ambient air quality in the smelter's DLA.

### § 57.503 Control measures.

The NSO of any smelter subject to the requirements of § 57.502(b) shall be amended, if necessary, within 6 months of EPA's receipt of the analysis specified in § 57.502(b), as provided in § 57.704(c) to implement the requirement of § 57.501. Measures required to be implemented may include:

(a) *Additional supplementary control.* The use of the supplementary control system, if the additional use of the system does not interfere with the smelter owner's ability to meet the requirements of subpart D; and

(b) *Engineering and maintenance techniques.* The use of engineering and maintenance techniques to detect and prevent leaks and capture and vent fugitive emissions through appropriate stacks. These techniques include but are not limited to:

(1) For reactors, installation and proper operation of primary hoods;

(2) For roasters, installation and proper operation of primary hoods on all hot calcine transfer points;

(3) For furnaces, installation and proper operation of primary hoods on all active matte tap holes, matte launders, slag skim bays, and transfer points;

(4) For converters, installation and proper operation of primary hoods for blowing operations, and where appropriate, secondary hoods for charging and pouring operations;

(5) For sintering machines, installation and proper operation of primary hoods on the sinter bed, all hot sinter ignition points, all concentrate laydown points, and all hot sinter transfer points;

(6) For blast furnaces, installation and proper operation of primary hoods on all active slag and lead bullion furnace tap holes and transfer points;

(7) For dross reverberatory furnaces, installation and proper operation of primary hoods on all active charging and discharging points;

(8) Maintenance of all ducts, flues and stacks in a leak-free condition to the maximum extent possible;

(9) Maintenance of all process equipment under normal operating conditions in such a fashion that out-leakage of fugitive gases will be prevented to the maximum extent possible;

(10) Secondary or tertiary hooding on process equipment where necessary; and

(11) Partial or complete building evacuation as appropriate.

### § 57.504 Continuing evaluation of fugitive emission control measures.

Each NSO shall require the smelter owner to conduct an active program to continuously review the effectiveness of the fugitive emission control measures implemented pursuant to § 57.503 in maintaining the NAAQS and, if such measures are not sufficiently effective, to evaluate what additional measures should be taken to assure that the NAAQS will be maintained with a reasonably degree of reliability. The NSO shall also require submission of a semiannual report to the issuing Agency detailing the results of this review and evaluation. Such a report may be submitted as part of the report required under § 57.402(f).

### § 57.505 Amendments of the NSO.

An NSO shall be amended within three months of submission of any report required under § 57.504 so as to require additional fugitive emission control measures if such report establishes that such additional measures are necessary to assure that the NAAQS will be maintained with a reasonable degree of reliability.

## Subpart F—Research and Development Requirements

### § 57.601 General requirements.

(a) This subpart is not applicable to NSOs which contain a SIP compliance schedule in accordance with § 57.705.

(b) The requirements of this subpart may be waived with respect to a smelter if the owner of that smelter submits with its NSO application a written certification by a corporate official authorized to make such a certification that the smelter will either comply with its $SO_2$ SIP limits by January 2, 1988 or close after January 1, 1988 until it can comply with such limits.

(c) Except as provided in paragraphs (a) and (b), each NSO shall require the smelter to conduct or participate in a specific research and development program designed to develop more effective means of compliance with the sulfur dioxide control requirements of the applicable State Implementation Plan than presently exist.

### § 57.602 Approval of proposal.

(a) *The smelter owner's proposal.* The smelter owner's NSO application shall include a proposed NSO provision for implementing the requirement of § 57.601, a fully documented supporting analysis of the proposed program, and an evaluation of the consistency of the proposed program with the criteria listed in § 57.603. The application shall also specify:

(1) The design and substantive elements of the research and development program, including the expected amount of time required for their implementation;

(2) The annual expected capital, operating, and other costs of each element in the program;

(3) The smelter's current production processes, pollution control equipment, and emissions which are likely to be affected by the program;

(4) Potential or expected benefits of the program;

(5) The basis upon which the results of the program will be evaluated; and

(6) The names, positions, and qualifications of the individuals responsible for conducting and supervising the project.

(b) *EPA approval.* (1) If the issuing agency will not be EPA, the smelter owner or the issuing agency may also submit to EPA the information specified in paragraph (a) of this section at the same time the information is submitted to the issuing agency. As soon as possible after the receipt of the information described in paragraph (a) of this section, EPA shall certify to the issuing agency and to the applicant whether or not in the judgment of the Administrator the smelter owner's final proposals are approvable. If EPA does not receive an advance copy of the proposal, the ultimate approval will occur when the NSO is approved rather than in advance of receipt of the NSO.

(2) A prerequisite for approval of an R&D proposal by EPA and any issuing agency is that the planned work must yield the most cost effective technology possible.

(c) *Optional preproposal.* The smelter owner may, at its option, submit to EPA for its approval and comment a preproposal generally describing the project the owner intends to propose under paragraph (a) of this section. A preproposal may be submitted to EPA any time prior to the submission of a proposal under paragraph (a) of this section. As soon as possible after the receipt of a preproposal, EPA shall certify to the applicant (and to any other issuing agency, as applicable) whether or not the project would be approvable. This certification may include comments indicating necessary modifications which would make the project approvable.

**§ 57.603 Criteria for approval.**

The approvability of any proposed research and development program shall be judged primarily according to the following criteria:

(a) The likelihood that the project will result in the use of more effective means of emission limitation by the smelter within a reasonable period of time and that the technology can be implemented at the smelter in question, should the smelter be placed on a SIP compliance schedule at some future date when adequately demonstrated technology is reasonably available;

(b) Whether the proposed funding and staffing of the project appear adequate for its successful completion;

(c) Whether the proposed level of funding for the project is consistent with the research and development expenditure levels for pollution control found in other industries;

(d) The potential that the project may yield industrywide pollution control benefits;

(e) Whether the project may also improve control of other pollutants of both occupational and environmental significance;

(f) The potential effects of the project on energy conservation; and

(g) Other non-air quality health and environmental considerations.

**§ 57.604 Evaluation of projects.**

The research and development proposal shall include a provision for the employment of a qualified independent engineering firm to prepare written reports at least annually which evaluate each completed significant stage of the research and development program, including all relevant information and data generated by the program. All reports required by this paragraph shall be submitted to EPA and also to the issuing agency if it is not EPA.

**§ 57.605 Consent.**

Each NSO shall incorporate by reference a binding written consent, signed by a corporate official empowered to do so, requiring the smelter owner to:

(a) Carry out the approved research and development program;

(b) Grant each issuing agency and EPA and their contractors access to any information or data employed or generated in the research and development program, including any process, emissions, or financial records which such agency determines are needed to evaluate the technical or economic merits of the program;

(c) Grant physical access to representatives and contractors of each issuing agency to each facility at which such research is conducted;

(d) Grant the representatives and contractors of EPA and the issuing agency reasonable access to the persons conducting the program on behalf of the smelter owner for discussions of progress, interpretation of data and results, and any other similar purposes as deemed necessary by EPA or any issuing agency.

**§ 57.606 Confidentiality.**

The provisions of section 114 of the Act and 40 CFR part 2 shall govern the confidentiality of any data or information provided to EPA under this subpart.

## Subpart G—Compliance Schedule Requirements

**§ 57.701 General requirements.**

This section applies to all smelters applying for an NSO. Each NSO shall require the smelter owner to meet all of the requirements within the NSO as expeditiously as practicable but in no case later than the deadlines contained in this subpart or any other section of

these regulations. For requirements not immediately effective, the NSO shall provide increments of progress and a schedule for compliance. Each schedule must reflect the extent to which any required equipment or systems are already in place and the extent to which any required reports or studies have already been completed. Requirements for smelters to submit compliance schedules and the procedures which they must follow are outlined below.

### § 57.702 Compliance with constant control emission limitation.

(a) This section applies to all smelters which receive an NSO, but only to the extent this section is compatible with any SIP compliance schedule required by §§ 57.201(d)(2) and 57.705.

(b) Any NSO issued to a smelter not required to immediately comply with the requirements of subpart G under § 57.701 shall contain a schedule for compliance with those requirements as expeditiously as practicable but in no case later than 6 months from the effective date of the NSO, except as follows: Where a waiver is requested in accordance with subpart H, an NSO may be issued without a schedule for compliance with the requirements for which a waiver is being considered consistent with subpart H, pending a final decision on the request under subpart H. If a waiver is requested in accordance with subpart H, compliance with the requirements of subpart C which were deferred as a result of such request shall be achieved as expeditiously as practicable after, but in no case later than 6 months from a final decision by the issuing agency to deny a waiver under subpart H or disapproval by EPA of a waiver granted by the issuing agency. The time limits specified herein may be extended only if a smelter operator demonstrates that special circumstances warrant more time, in which case the compliance schedule shall require compliance as expeditiously as practicable. An NSO which does not contain a schedule for compliance with all the requirements of subpart C because a waiver has been requested in accordance with subpart H shall be amended in accordance with § 57.104 within three months after a final decision under subpart H so as to either grant a waiver of any remaining requirements of subpart C, or deny such a waiver and place the smelter on a compliance schedule for meeting those requirements. If the issuing agency grants a waiver and such waiver is disapproved by EPA, the issuing agency shall promptly amend the NSO so as to place the smelter on a compliance schedule meeting any remaining requirements of subpart C.

(c) Any schedule required under this section shall contain the following information and increments of progress to the extent applicable:

(1) Description of the overall design of the $SO_2$ control system(s) to be installed;

(2) Descriptions of specific process hardware to be used in achieving compliance with interim $SO_2$ constant controls including gas capacity values;

(3) The date by which contracts will be let or purchase orders issued to accomplish any necessary performance improvements;

(4) The date for initiating on-site construction or installation of necessary equipment;

(5) The date by which on-site construction or installation of equipment is to be completed; and

(6) The date for achievement of final compliance with interim emission limitations.

### § 57.703 Compliance with the supplementary control system requirements.

This section applies to all nonferrous smelters applying for an NSO.

(a) Schedules for smelters with existing SCS. Each NSO shall require immediately upon issuance of the NSO operation of any existing supplementary control system and immediately upon the effective date of the NSO the assumption of liability for all violations of the NAAQS detected by any monitor in the SCS system. Each NSO shall require that within six months of the effective date of the NSO the smelter complete any measures specified in the smelter's approved SCS development plan not implemented at the time the NSO is issued, and assume liability for all violations of the NAAQS detected

anywhere in the DLA (except as provided in subpart D of these regulations). Other requirements of subpart D such as the requirements for submission of reports records, and for ongoing evaluation of the SCS shall be complied with at the times specified in subpart D and § 57.701.

(b) Compliance schedule for smelters with no existing SCS system. Where a smelter has no SCS at the time of issuance of the NSO, the NSO shall require compliance with the requirements of subpart D according to the following schedule:

(1) Within six months after the effective date of the NSO the smelter shall install all operating elements of the SCS system, begin operating the system, complete all other measures specified in its approved SCS development plan, begin compliance with the requirements of § 57.404, and assume liability for any violations of the NAAQS within its designated liability area (except as provided by subpart D), detected by the SCS monitors in place.

(2) Within nine months thereafter the smelter shall submit the SCS Report, assume liability for all violations of the NAAQS detected anywhere within its designated liability area, and comply with all other requirements of subpart D, except for those which subpart D specifies are to be satisfied at or after the close of such nine-month period, including requirements for submission of studies, reports, and records, and the requirements for continued review and evaluation of the SCS.

### § 57.704 Compliance with fugitive emission evaluation and control requirements.

This section applies only to smelters not required to submit SIP Compliance Schedules under § 57.705. Each NSO shall require that smelters satisfy each of the requirements of subpart E as expeditiously as practicable, taking into account the extent to which those requirements have already been satisfied, and in any event, within any deadlines specified below.

(a) *Plan for fugitive emission control.* The NSO shall provide that within a reasonable period after the submission of the report on the fugitive emission control study required by § 57.502, but within a period allowing sufficient time for compliance with the requirement of § 57.503 for amendment of the NSO, the smelter owner shall submit to the issuing agency for its approval a proposed fugitive emission control plan, including increments of progress, for compliance with the requirements of §§ 57.501 and 57.503.

(b) *SCS Report.* If the fugitive emission control plan submitted under paragraph (a) of this section proposes to meet the requirements of §§ 57.501 and 57.503 through the additional use of a supplementary control system, the plan shall demonstrate that the use of supplementary controls at that smelter to prevent violations of the NAAQS resulting from fugitive emissions is practicable, adequate, reliable, and enforceable. The plan shall contain increments of progress providing for completion of the implementation of each additional measure, and for corresponding compliance with the requirements of paragraphs (b) and (c) of § 57.404, within four months of approval of the plan by the issuing agency. The plan shall also provide that within three months after completion of implementation of those additional measures, the smelter shall fully comply with the requirements of §§ 57.401 and 57.501 (including the assumption of liability for violations of NAAQS within its designated liability area), and shall submit and additional SCS report for the approval of the issuing agency. This additional final report shall correspond to that submitted under § 57.405(b)(2), except that it need not contain the 3-month study described in § 57.405(b)(2)(iii).

(c) *NSO amendment.* The amendments of the NSO required under § 57.503 shall be affected by the issuing agency as follows:

(1) With respect to the additional use of SCS, upon approval or promulgation of the plan submitted under paragraph (a) of this section and upon approval or promulgation of the requirements for the system described in the additional SCS Report under paragraph (b) of this section;

(2) With respect to the additional use of engineering techniques, upon approval or promulgation of the compliance schedule required by paragraph (a) of this section.

### § 57.705 Contents of SIP Compliance Schedule required by § 57.201(d) (2) and (3).

This section applies to smelters which are required to submit a SIP Compliance Schedule as discussed below.

(a) Each SIP Compliance Schedule required by § 57.201(d) (2) and (3) must contain the following elements:

(1) Description of the overall design of the $SO_2$ control system(s) to be installed;

(2) Descriptions of specific process hardware to be used in achieving compliance with the SIP emission limitation including gas capacity values;

(3) The date by which contracts will be let or purchase orders issued to accomplish any necessary performance improvements;

(4) The date for initiating on-site construction or installation of necessary equipment;

(5) The date by which on-site construction or installation of equipment is to be completed;

(6) The date for achievement of final compliance with SIP emission limitations; and

(7) Any other measures necessary to assure compliance with all SIP requirements as expeditiously as practicable.

(b) *Operations of SCS.* Smelters to which § 57.705 is applicable must comply with all elements of § 57.703.

## Subpart H—Waiver of Interim Requirement for Use of Continuous Emission Reduction Technology

### § 57.801 Purpose and scope.

(a) This subpart shall govern all proceedings for the waiver of the interim requirement that each NSO provide for the use of constant controls.

(b) In the absence of specific provisions in this subpart, and where appropriate, questions arising at any stage of the proceeding shall be resolved at the discretion of the Presiding Officer or the Administrator, as appropriate.

### § 57.802 Request for waiver.

(a) *General.* (1) Each smelter owner requesting a waiver shall complete, sign, and submit appendix A (Test for Eligibility for Interim Waiver). Copies of appendix A may be obtained from any EPA Regional Administrator, or from the Director, Stationary Source Compliance Division (EN–341), U.S. Environmental Protection Agency, 1200 Pennsylvania Ave., NW., Washington, DC 20460. Claims of confidentiality shall be made as provided in § 57.203.

(2) The smelter owner shall append to the completed and signed appendix A full copies of all documents, test results, studies, reports, scientific literature and assessments required by appendix A. To the extent that the material consists of generally available published material, the smelter owner may cite to the material in lieu of appending it to appendix A. The smelter owner shall specifically designate those portions of any documents relied upon and the facts or conclusions in appendix A to which they relate.

(b) *Effect of submitting incomplete application.* (1) The Administrator, or a person designated by him to review applications for waivers, may advise the smelter owner in writing whenever he determines that additional information is needed in order to make the waiver eligibility determinations required by section 119(d)(2) of the Act. The smelter owner shall promptly supply such information. All additional information requested under this paragraph and filed in the manner required by paragraph (d) shall be deemed part of appendix A.

(2) Failure to comply with the requirements of paragraphs (a) and (b)(1) of this section shall be grounds for denial of the requested waiver.

(c) *Time for requesting waivers.* Any request for a waiver must be submitted to the Administrator by the smelter owner at the time of the application for an NSO from the State or the Administrator, as the case may be. Where a smelter was issued a second period NSO by a State before these regulations went into effect, a request for a waiver shall be made and a completed appendix A shall be submitted, within sixty days of the effective date of these regulations, unless an extension is

granted by the Administrator, or his designee, for good cause.

(d) *Submission of request.* A copy of appendix A (plus attachments) which has been completed for the purpose of requesting a waiver of constant control requirements shall be filed with the Administrator, addressed as follows: Director, Stationary Source Compliance Division (EN–341), U.S. Environmental Protection Agency, 1200 Pennsylvania Ave., NW., Washington, DC 20460, Attn: Confidential Information Unit.

(e) *Eligibility.* A smelter shall be eligible for consideration under this subpart only if it establishes that (1) its existing strong stream controls, if any, lack the capacity while in full operation to treat all strong stream sulfur dioxide emissions and (2) bypass of strong stream controls due to excess strong stream sulfur dioxide emissions cannot be avoided with improved operation and maintenance of existing strong stream controls and process equipment.

(f) *Criteria for decision.* The Administrator shall grant or approve a waiver, whichever is appropriate, for any eligible smelter as to which he finds, in accordance with the methods and procedures specified in appendix A, that:

(1) The higher of the two net present values of future cash flows completed under the two alternative sets of assumptions set forth in the instructions to schedule D.6 in appendix A in less than liquidation (salvage) value; or

(2) The smelter's average variable costs at all relevant levels of production (after installation of interim constant control equipment) would exceed the weighted average price of smelter output for one year or more.

### § 57.803 Issuance of tentative determination; notice.

(a) *Tentative determination.* (1) The EPA staff shall formulate and prepare:

(i) A ''Staff Computational Analysis,'' using the financial information submitted by the smelter owner under § 57.802 to evaluate the economic circumstances of the smelter for which the waiver is sought;

(ii) A tentative determination as to whether an interim requirement for the use of constant controls would be so costly as to necessitate permanent or prolonged temporary cessation of operations at the smelter for which the waiver is requested. The tentative determination shall contain a ''Proposed Report and Findings'' summarizing the conclusions reached in the Staff Computational Analysis, discussing the estimated cost of interim controls, and assessing the effect upon the smelter of requiring those controls. The tentative determination shall also contain a proposed recommendation that the waiver be granted or denied, based upon the Proposed Report and Findings, and stating any additional considerations supporting the proposed recommendation. This tentative determination shall be a public document.

(2) In preparing the Proposed Report and Findings, the EPA staff shall attempt to the maximum extent feasible to avoid revealing confidential information which, if revealed, might damage the legitimate business interests of the applicant. The preceding sentence notwithstanding, the tentative determination shall be accompanied by a listing of all materials considered by EPA staff in developing the tentative determination. Subject to the provisions of § 57.814(a), full copies of all such materials shall be included in the administrative record under § 57.814, except that, to the extent the material consists of published material which is generally available, full citations to that material may be given instead.

(b) *Public notice.* Public notice of EPA's tentative determination to grant or deny an application for a waiver shall be given by:

(1) Publication at least once in a daily newspaper of general circulation in the area in which the smelter is located; and

(2) Posting in the principal office of the municipality in which the smelter is located.

(c) *Individual notice.* Individual notice of EPA's tentative determination to grant or deny an application for a waiver shall be mailed to the smelter owner by certified mail, return receipt requested, and to the air pollution control agency for the State in which the smelter is located.

(d) *Request for individual notice.* EPA shall mail notice of its tentative determination to grant or deny an application for waiver to any person upon request. Each such request shall be submitted to the Administrator in writing, shall state that the request is for individual notice of tentative determination to grant or deny any application for a waiver under section 119(d) of the Clean Air Act, and shall describe the notice or types of notices desired (e.g., all notices, notices for a particular Region, notices for a particular State, notice for a particular city).

(e) *Form of notice.* The notice of tentative determination required to be distributed under paragraphs (b), (c), and (d) of this section shall include, in addition to any other materials, the following:

(1) A summary of the information contained in appendix A;

(2) The tentative determination prepared under paragraph (a) of this section: Provided, that except in the case of the smelter owner, a summary of the basis for the grant or denial of the waiver may be provided in lieu of the formal determinations required by paragraph (a)(1) of this section;

(3) A brief description of the procedures set forth in § 57.804 for requesting a public hearing on the waiver request, including a statement that such request must be filed within 30 days of the date of the notice;

(4) A statement that written comments on the tentative determination submitted to EPA within 60 days of the date of the notice will be considered by EPA in making a final decision on the application; and

(5) The location of the administrative record and the location at which interested persons may obtain further information on the tentative determination, including a copy of the index to the record, the tentative determination prepared under paragraph (a) of this section, and any other nonconfidential record materials.

### § 57.804 Request for hearing; request to participate in hearing.

(a) *Request for hearing.* Within 30 days of the date of publication or receipt of the notice required by § 57.803, any person may request the Administrator to hold a hearing on the tentative determination by submitting a written request containing the following:

(1) Identification of the person requesting the hearing and his interest in the proceeding;

(2) A statement of any objections to the tentative determination; and

(3) A statement of the issues which such person proposes to raise for consideration at such hearing.

(b) *Grant or denial of hearing; notification.* Whenever (1) the Administrator has received a written request satisfying the requirements of paragraph (a) of this section which presents genuine issues as to the effect on the smelter of the requirement for use of constant controls, or (2) the Administrator determines in his discretion that a hearing is necessary or appropriate the Administrator shall give written notice of his determination to each person requesting such hearing and the smelter owner, and shall provide public notice of his determination in accordance with § 57.803(b). If the Administrator determines that a request filed under paragraph (a) of this section does not comply with the requirements of paragraph (a) or does not present genuine issues, he shall be given written notice of his decision to deny a hearing to the person requesting the hearing.

(c) *Form of notice of hearing.* Each notice of hearing disseminated under paragraph (b) of this section shall contain:

(1) A statement of the time and place of the hearing;

(2) A statement identifying the place at which the official record on the application for waiver is located, the hours during which it will be open for public inspection, and the documents contained in the record as of the date of the notice of hearing;

(3) The due date for filing a written request to participate in the hearing under paragraph (d) of this section;

(4) The due date for making written submissions under 57.805; and

(5) The name, address, and office telephone number of the hearing Clerk for the hearing.

(d) *Request to participate in hearing.* Each person desiring to participate in any hearing granted under this section, including any person requesting such a

hearing, shall file a written request to participate with the Hearing Clerk by the deadline set forth in the notice of hearing. The request shall include:

(1) A brief statement of the interest of the person in the proceeding;

(2) A brief outline of the points to be addressed;

(3) An estimate of the time required; and

(4) If the request is submitted by an organization, a nonbinding list of the persons to take part in the presentation. As soon as practicable, but in no event later than two weeks before the scheduled date of the hearing, the Hearing Clerk shall make available to the public and shall mail to each person who asked to participate in the hearing a hearing schedule.

(e) *Effect of denial of or absence of request for hearing.* If no request for a hearing is made under this section, or if all such requests are denied under paragraph (b) of this section, the tentative determination issued under § 57.803 shall be treated procedurally as if it were a recommended decision issued under § 57.811(b)(2), except that for purposes of §§ 57.812 and 57.813 the term ''hearing participant'' shall be construed to mean the smelter owner and any person who submitted comments under § 57.803(e)(4).

### § 57.805 Submission of written comments on tentative determination.

(a) *Main comments.* Each person who has filed a request to participate in the hearing shall file with the Hearing Clerk no later than 30 days before the scheduled start of the hearing (or such other date as may be set forth in the notice of hearing) any comments which he has on the request for waiver and EPA's tentative determination, based on information which is or reasonably could have been available to that person at the time.

(b) *Reply comments.* Not later than two weeks after a full transcript of the hearing becomes available (or such other date as may be set forth in the notice of hearing), each person who has filed a request to participate in the hearing shall file with the Hearing Clerk any comments he may have on:

(1) Written comments submitted by other participants pursuant to paragraph (a) of this section;

(2) Written comments submitted in response to the notice of hearing;

(3) Material in the hearing record; and

(4) Material which was not and could not reasonably have been available prior to the deadline for submission of main comments under paragraph (a) of this section.

(c) *Form of comments.* All comments should be submitted in quadruplicate and shall include any affidavits, studies, tests or other materials relied upon for making any factual statements in the comments.

(d) *Use of comments.* (1) Written comments filed under this section shall constitute the bulk of the evidence submitted at the hearing. Oral statements at the hearing should be brief, and restricted either to points that could not have been made in written comments, or to emphasizing points which are made in the comments, but which the participant believes can be more forcefully urged in the hearing context.

(2) Notwithstanding the foregoing, within two weeks prior to either deadline specified by paragraph (a) of this section for the filing of main comments, any person who has filed a request to participate in the hearing may file a request with the Presiding Officer to submit all or part of his main comments orally at the hearing in lieu of submitting written comments. The Presiding Officer shall, within one week, grant such request if he finds that such person will be prejudiced if he is required to submit such comments in written form.

### § 57.806 Presiding Officer.

(a) *Assignment of Presiding Officer.* (1) The Administrator shall, as soon as practicable after the granting of a request for hearing under § 57.803, request that the Chief Administrative Law Judge assign an Administrative Law Judge as Presiding Officer. The Chief Administrative Law Judge shall thereupon make the assignment.

(2) If the parties to the hearing waive their right to have the Agency or an Administrative Law Judge preside at

the hearing, the Administrator shall appoint an EPA employee who is an attorney to serve as presiding officer.

(b) *Powers and duties of Presiding Officer*. It shall be the duty of the Presiding Officer to conduct a fair and impartial hearing, assure that the facts are fully elicited, and avoid delay. The Presiding Officer shall have authority to:

(1) Chair and conduct administrative hearings held under this subpart;

(2) Administer oaths and affirmations;

(3) Receive relevant evidence: Provided, that the administrative record, as defined in § 57.814, shall be received in evidence;

(4) Consider and rule upon motions, dispose of procedural requests, and issue all necessary orders;

(5) Hold conferences for the settlement or simplification of the issues or the expediting of the proceedings; and

(6) Do all other acts and take all measures necessary for the maintenance of order and for the efficient, fair and impartial conduct of proceedings under this subpart.

[50 FR 6448, Feb. 15, 1985, as amended at 57 FR 5328, Feb. 13, 1992]

### § 57.807 Hearing.

(a) *Composition of hearing panel*. The Presiding Officer shall preside at the hearing held under this subpart. An EPA panel shall also take part in the hearing. In general, the membership of the panel shall consist of EPA employees having special expertise in areas related to the issues to be addressed at the hearing, including economists and engineers. For this reason, the membership of the panel may change as different issues are presented for discussion.

(b) *Additional hearing participants*. Either before or during the hearing, the Presiding Officer, after consultation with the panel, may request that a person not then scheduled to participate in the hearing (including an EPA employee or a person identified by any scheduled hearing participant as having knowledge concerning the issues raised for discussion at the hearing) make a presentation or make himself available for cross-examination at the hearing.

(c) *Questioning of hearing participants*. The panel members may question any person participating in the hearing. Cross-examination by persons other than panel members shall not be permitted at this stage of the proceeding except where the Presiding Officer determines, after consultation with the panel, that circumstances compel such cross-examination. However, persons in the hearing audience, including other hearing participants, may submit written questions to the Presiding Officer for the Presiding Officer to ask the participants, and the Presiding Officer may, after consultation with the panel, and in his sole discretion, ask these questions.

(d) *Submission of additional material*. Participants in the hearing shall submit for the hearing record such additional material as the hearing panel may request within 10 days following the close of the hearing, or such other period of time as is ordered by the Presiding Officer. Participants may also submit additional information for the hearing record on their own accord within 10 days after the close of the hearing.

(e) *Transcript*. A verbatim transcript shall be made of the hearing.

### § 57.808 Opportunity for cross-examination.

(a) *Request for cross-examination*. After the close of the panel hearing conducted under this part, any participant in that hearing may submit a written request for cross-examination. The request shall be received by EPA within one week after a full transcript of the hearing becomes available and shall specify:

(1) The disputed issue(s) of material fact as to which cross-examination is requested. This shall include an explanation of why the questions at issue are factual, rather than of an analytical or policy nature; the extent to which they are in dispute in the light of the record made thus far, and the extent to which and why they can reasonably be considered material to the decision on the application for a waiver; and

(2) The person(s) the participant desires to cross-examine, and an estimate

of the time necessary. This shall include a statement as to why the cross-examination requested can be expected to result in full and true disclosure resolving the issue of material fact involved.

(b) *Order granting or denying request for cross-examination.* As expeditiously as practicable after receipt of all requests for cross-examination under paragraph (a) of this section, the Presiding Officer, after consultation with the hearing panel, shall issue an order either granting or denying each such request, which shall be disseminated to all persons requesting cross-examination and all persons to be cross-examined. If any request for cross-examination is granted, the order shall specify:

(1) The issues as to which cross-examination is granted;

(2) The persons to be cross-examined on each issue;

(3) The persons allowed to conduct cross-examination;

(4) Time limits for the examination of witnesses; and

(5) The date, time and place of the supplementary hearing at which cross-examination shall take place. In issuing this ruling, the Presiding Officer may determine that one or more participants have the same or similar interests and that to prevent unduly repetitious cross-examination, they should be required to choose a single representative for purposes of cross-examination. In such a case, the order shall simply assign time for cross-examination by that single representative without identifying the representative further.

(c) *Supplementary hearing.* The Presiding Officer and at least one member of the original hearing panel shall preside at the supplementary hearing. During the course of the hearing, the Presiding Officer shall have authority to modify any order issued under paragraph (b) of this section. A verbatim transcript shall be made of this hearing.

(d) *Alternatives to cross-examination.* (1) No later than the time set for requesting cross-examination, a hearing participant may request that alternative methods of clarifying the record (such as the submittal of additional written information) be used in lieu of or in addition to cross-examination. The Presiding Officer shall issue an order granting or denying such request at the time he issues (or would have issued) an order under paragraph (b) of this section. If the request is granted, the order shall specify the alternative provided and any other relevant information (e.g., the due date for submitting written information).

(2) In passing on any request for cross-examination submitted under paragraph (a) of this section, the Presiding Officer may, as a precondition to ruling on the merits of such request, require that alternative means of clarifying the record be used whether or not a request to do so has been made under the preceding paragraph. The person requesting cross-examination shall have one week to comment on the results of utilizing such alternative means, following which the Presiding Officer, as soon as practicable, shall issue an order granting or denying such person's request for cross-examination.

### § 57.809 *Ex parte* communications.

(a) *General.* (1) No interested person outside the Agency or member of the Agency trial staff shall make or knowingly cause to be made to any member of the decisional body an *ex parte* communication relevant to the merits of the proceedings.

(2) No member of the decisional body shall make or knowingly cause to be made to any interested person outside the Agency or member of the Agency trial staff an *ex parte* communication relevant to the merits of the proceedings.

(b) *Effect of receipt of ex parte communication.* (1) A member of the decisional body who receives or who makes or knowingly causes to be made a communication prohibited by this subsection shall place in the record all written communications or memoranda stating the substance of all oral communications together with all written responses and memoranda stating the substance of all responses.

(2) Upon receipt by any member of the decisionmaking body of an *ex parte* communication knowingly made or knowingly caused to be made by a party or representative of a party in violation of this section, the person

presiding at the stage of the hearing then in progress may, to the extent consistent with justice and the policy of the Clean Air Act, require the party to show cause why its claim or interest in the proceedings should not be dismissed, denied, disregarded, or otherwise adversely affected on account of such violation.

(c) *Definitions.* For purposes of this section, the following definitions shall apply:

(1) *Agency trial staff* means those Agency employees, whether temporary or permanent, who have been designated by the Agency as available to investigate, litigate, and present the evidence arguments and position of the Agency in the evidentiary hearing or non-adversary panel hearing. Appearance as a witness does not necessarily require a person to be designated as a member of the Agency trial staff;

(2) *Decisional body* means any Agency employee who is or may be reasonably expected to be involved in the decisional process of the proceeding including the Administrator, Presiding Officer, the Regional Administrator (if he does not designate himself as a member of the Agency trial staff), and any of their staff participating in the decisional process. In the case of a non-adversary panel hearing, the decisional body shall also include the panel members whether or not permanently employed by the Agency;

(3) *Ex parte communication* means any communication, written or oral, relating to the merits of the proceeding between the decisional body and an interested person outside the Agency or the Agency trial staff which was not originally filed or stated in the administrative record or in the hearing. *Ex parte* communications do not include:

(i) Communications between Agency employees other than between the Agency trial staff and the member of the decisional body;

(ii) Discussions between the decisional body and either:

(A) Interested persons outside the Agency, or;

(B) The Agency trial staff if all parties have received prior written notice of such proposed communications and have been given the opportunity to be present and participate therein.

(4) *Interested person outside the Agency* includes the smelter owner, any person who filed written comments in the proceeding, any person who requested the hearing, any person who requested to participate or intervene in the hearing, any participant or party in the hearing and any other interested person not employed by the Agency at the time of the communications, and the attorney of record for such persons.

[50 FR 6448, Feb. 15, 1985, as amended at 57 FR 5328, Feb. 13, 1992]

### § 57.810 Filing of briefs, proposed findings, and proposed recommendations.

Unless otherwise ordered by the Presiding Officer, each hearing participant may, within 20 days after reply comments are submitted under § 57.805(b), or if a supplementary hearing for the purpose of cross-examination has been held under § 57.808(c), within 20 days after the transcript of such supplemental hearing becomes available or if alternative methods of clarifying the record have been used under § 57.808(d), within 20 days after the alternative methods have been employed, file with the Hearing Clerk and serve upon all other hearing participants proposed findings and proposed recommendations to replace in whole or in part the findings and recommendations contained in the tentative determination. Any such person may also file, at the same time, a brief in support of his proposals, together with references to relevant pages of transcript and to relevant exhibits. Within 10 days thereafter each participant may file a reply brief concerning alternative proposals. Oral argument may be held at the discretion of the Presiding Officer on motion of any hearing participant or sua sponte.

### § 57.811 Recommended decision.

As soon as practicable after the conclusion of the hearing, one or more responsible employees of the Agency shall evaluate the record for preparation of a recommended decision and shall prepare and file a recommended decision with the Hearing Clerk. The employee(s) preparing the decision will generally be members of the hearing panel and may include the Presiding

Officer. Such employee(s) may consult with and receive assistance from any member of the hearing panel in drafting a recommended decision and may also delegate the preparation of the recommended decision to the panel or to any member or members of it. This decision shall contain the same elements as the tentative determination. After the recommended decision has been filed, the Hearing Clerk shall serve a copy of such decision on each hearing participant and upon the Administrator.

**§ 57.812 Appeal from or review of recommended decision.**

(a) *Exceptions.* (1) Within 20 days after service of the recommended decision, any hearing participant may take exception to any matter set forth in such decision or to any adverse order or ruling of the Presiding Officer prior to or during the hearing to which such participant objected, and may appeal such exceptions to the Administrator by filing them in writing with the Hearing Clerk. Such exceptions shall contain alternative findings and recommendations, together with references to the relevant pages of the record and recommended decision. A copy of each document taking exception to the recommended decision shall be served upon every other hearing participant. Within the same period of time each party filing exceptions shall file with the Administrator and shall serve upon all hearing participants a brief concerning each of the exceptions being appealed. Each brief shall include page references to the relevant portions of the record and to the recommended decision.

(2) Within 10 days of the service of exceptions and briefs under paragraph (a)(1) of this section, any hearing participant may file and serve a reply brief responding to exceptions or arguments raised by any other hearing participant together with references to the relevant portions of the record, recommended decision, or opposing brief. Reply briefs shall not, however, raise additional exceptions.

(b) *Sua sponte review by the Administrator.* Whenever the Administrator determines *sua sponte* to review a recommended decision, notice of such intention shall be served upon the parties by the Hearing Clerk within 30 days after the date of service of the recommended decision. Such notice shall include a statement of issues to be briefed by the hearing participants and a time schedule for the service and filing of briefs.

(c) *Scope of appeal or review.* The appeal of the recommended decision shall be limited to the issues raised by the appellant, except when the Administrator determines that additional issues should be briefed or argued. If the Administrator determines that briefing or argument of additional issues is warranted, all hearing participants shall be given reasonable written notice of such determination to permit preparation of adequate argument.

(d) *Argument before the Administrator.* The Administrator may, upon request by a party or sua sponte, set a matter for oral argument. The time and place for such oral argument shall be assigned after giving consideration to the convenience of the parties.

**§ 57.813 Final decision.**

(a) *After review.* As soon as practicable after all appeal or other review proceedings have been completed, the Administrator shall issue his final decision. Such a final decision shall include the same elements as the recommended decision, as well as any additional reasons supporting his decisions on exceptions filed by hearing participants. The final decision may accept or reject all or part of the recommended decision. The Administrator may consult with the Presiding Officer, members of the hearing panel or any other EPA employee in preparing his final decision. The Hearing Clerk shall file a copy of the decision on all hearing participants.

(b) *In the absence of review.* If no party appeals a recommended decision to the Administrator and if the Administrator does not review it sua sponte, he shall be deemed to have adopted the recommended decision as the final decision of the Agency upon the expiration of the time for filing any exceptions under § 57.812(a).

(c) *Timing of judicial review.* For purposes of judicial review, final Agency action on a request for a waiver of the

interim requirement that each NSO provide for the use of constant controls shall not occur until EPA approves or disapproves the issuance of an NSO to the source requesting such a waiver.

### § 57.814 Administrative record.

(a) *Establishment of record.* (1) Upon receipt of request for a waiver, an administrative record for that request shall be established, and a Record and Hearing Clerk appointed to supervise the filing of documents in the record and to carry out all other duties assigned to him under this subpart.

(2) All material required to be included in the record shall be added to the record as soon as feasible after its receipt by EPA. All material in the record shall be appropriately indexed. The Hearing Clerk shall make appropriate arrangements to allow members of the public to copy all nonconfidential record materials during normal EPA business hours.

(3) Confidential record material shall be indexed under paragraph (a)(2). Confidential record material shall, however, be physically maintained in a separate location from public record material.

(4) Confidential record material shall consist of the following:

(i) Any material submitted pursuant to § 57.802 for which a proper claim of confidentiality has been made under section 114(c) of the Act and 40 CFR part 2; and

(ii) The Staff Computational Anaylsis prepared under § 57.803

(b) *Record for issuing tentative determination.* The administrative record for issuing the tentative determination required by § 57.803 shall consist of the material submitted under § 57.802 and any additional materials supporting the tentative determination.

(c) *Record for acting on requests for cross-examination.* The administrative record for acting on requests for cross-examination under § 57.808 shall consist of the record for issuing the tentative determination, all comments timely submitted under §§ 57.803(e)(4) and 57.805, the transcript of the hearing, and any additional material timely submitted under § 57.807(d).

(d) *Record for preparation of recommended decision.* The administrative record for preparation of the recommended decision required by § 57.811 shall consist of the record for acting on request for cross-examination, the transcript of any supplementary hearing held under § 57.808(c), any materials timely submitted in lieu of or in addition to cross-examination under § 57.808(d), and all briefs, proposed findings of fact and proposed recommendations timely submitted under § 57.810.

(e) *Record for issuance of final decision.* (1) Where no hearing has been held, the administrative record for issuance of the Administrator's final decision shall consist of the record for issuing the tentative determination, any comments timely submitted under § 57.803(e)(4), any briefs or reply briefs timely submitted under § 57.812 (a) through (c), and the transcript of any oral argument granted under § 57.812(d).

(2) Where a hearing has been held, the administrative record for issuance of the Administrator's final decision shall consist of the record of preparation of the recommended decision, any briefs or reply briefs submitted under § 57.812 (a) through (c), and the transcript of any oral argument granted under § 57.812(d).

### § 57.815 State notification.

The Administrator shall give notice of the final decision in writing to the air pollution control agency of the State in which the smelter is located.

### § 57.816 Effect of negative recommendation.

No waiver of the interim requirement for the use of constant controls shall be granted by the Administrator or a State unless the Administrator or a State first takes into account the Administrator's report, findings, and recommendations as to whether the use of constant controls would be so costly as to necessitate permanent or prolonged temporary cessations of operation of the smelter.

## APPENDIX A TO PART 57—PRIMARY NONFERROUS SMELTER ORDER (NSO) APPLICATION

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### *1. General Instructions*

1.1 Purpose of the application. This application provides financial reporting schedules and the accompanying instructions for EPA's determination of eligibility for a nonferrous smelter order (NSO), and for a waiver of the interim constant controls requirement of an NSO. Although the determination of eligibility for an NSO is prerequisite for the determination of a waiver, appendix A, as a matter of convenience to applicants, includes both the NSO and waiver tests and reporting schedules.

In order to support an NSO eligibility determination, the applicant must submit operating and financial data as specified by the schedules included in this application. Specific instructions for completing each schedule are provided in subsequent sections of the instructions. In general, applicants must provide:

(a) Annual income statements, balance sheets and supporting data covering the five most recent fiscal years for the smelter for which the NSO requested.

(b) Forecasts of operating revenues, operating costs, net income from operations and capital investments for the firm's smelter operations subject to this application, on the basis of anticipated smelter operations without any sulfur dioxide air pollution control facilities that have not been installed as of the NSO application date.

(c) Forecasts of operating revenues, operating costs, net income from operations and capital investments for the firm's smelter operations subject to this application, on the basis of anticipated smelter operations with expected additional sulfur dioxide control facilities required to comply with the smelter's SIP emission limitation.

(d) For smelters applying for a waiver of interim constant controls, forecasts of operating revenues, operating costs, and capital investments for the firm's smelter operations prepared on the basis of two alternative assumptions: (1) Installation of additional pollution control facilities required to comply with interim constant control requirements, no installation of any additional $SO_2$ controls that the smelter would otherwise be required to install but for the issuance of an NSO, and closure of the smelter after January 1, 1988; and (2) installation of additional pollution control facilities required to comply with interim constant control requirements, installation of any additional $SO_2$ controls required to comply with the smelter's SIP emission limitation by January 2, 1988, and continued operation of the smelter after January 1, 1988.

1.2 NSO financial tests. EPA will use separate tests to determine eligibility for an NSO and to evaluate applications for a waiver of the interim constant control requirement. The two tests for NSO eligibility employ a present value approach for determining the reasonable availability of constant control technology that will enable an applicant to achieve full compliance with its SIP sulfur dioxide emission limitation. The tests for the waiver of the interim constant control requirements employ variable costing and discounted cash flow standards for evaluating an applicant's economic capability to implement those requirements.

1.2.1 *NSO Eligibility Tests.* Each applicant must establish that the system of production and/or constant control technology that will enable the smelter to achieve full compliance with its SIP $SO_2$ emission limitation

standard is not reasonably available. An applicant will determine financial eligibility for an NSO by passing at least one of the following two tests.

(a) *Profit Protection Test.* The smelter will experience a reduction in pre-tax profits of 50 percent or more after undertaking the required installation of constant controls.

(b) *Rate of Return Test.* The smelter will earn a rate of return on historical net investment, expressed in constant dollars, below the industry average cost of capital after undertaking the required installation of constant controls.

1.2.2 *Temporary Waiver from Interim Controls.* Applicants that do not have an existing constant control system or whose constant controls are not sufficient when in operation and optimally maintained to treat all strong streams in accordance with subpart C, may apply for a waiver of the requirements of subpart C with respect to any interim constant controls not already installed. Applicants will be eligible for a temporary waiver of the requirement for interim constant controls not already installed, if they can establish pursuant to the procedures in this application that the imposition of such control requirements would economically necessitate closure of the smelter facility for a period of one year or longer. The economic justification for a non-permanent closure under this temporary waiver test is defined as a situation in which the smelter's projected operating revenues for one or more years during which the NSO is in effect are inadequate to cover variable operating costs anticipated after installing the required interim control technology. Temporary waivers will be granted for only the period of time over which applicants can establish an inability by the firm to cover its variable operating costs. Interim control waiver requests based on the smelter's projected inability to earn adequate income after installation of interim pollution control equipment will be subject to the permanent waiver test.

1.2.3 Permanent Waiver from Interim Controls. Applicants that do not have an existing constant control system or whose constant controls are not sufficient when in operation and optimally maintained to treat all strong streams in accordance with subpart C, may apply for a waiver of the requirements of subpart C with respect to any interim constant controls not already installed. Applicants will be eligible for a permanent waiver of the requirement for interim constant controls not already installed, if they can establish pursuant to the procedures in this application that an imposition of such control requirements would necessitate permanent closure of the smelter. Economic justification for a permanent closure is defined as a situation in which the present value of future cash flows anticipated from the smelter after installing the required interim control technology is less than the smelter's current salvage value under an orderly plan of liquidation. Future cash flows are determined under two alternative assumptions. The higher present value of cash flows computed under these assumptions is then compared to salvage value.

1.2.4 EPA Contact for NSO Inquiries. Inquiries concerning this portion of the requirements for NSO application should be addressed to Laxmi M. Kesari, Environmental Protection Agency, EN 341, 1200 Pennsylvania Ave., NW., Washington, DC 20460.

1.2.5 Certification. The NSO Certification Statement must be signed by an authorized officer of the applicant firm.

1.3 Confidentiality. Applicants may request that information contained in this application be treated as confidential. Agency regulations concerning claims of confidentiality of business information are contained in 40 CFR part 2, subpart B (41 FR 36902 *et seq.*, September 1, 1976, as amended by 43 FR 39997 *et seq.*, September 8, 1978). The regulations provide that a business may, if it desires, assert a business confidentiality claim covering part or all of the information furnished to EPA. The claim must be made at the same time the applicable information is submitted. The manner of asserting such claims is specified in 40 CFR 2.203(b). Information covered by such a claim will be handled by the Agency in accordance with procedures set forth in the subpart B regulations. EPA will not disclose information on a business that has made a claim of confidentiality, except to the extent of and in accordance with 40 CFR part 2, subpart B. However, if no claim of confidentiality is made when information is furnished to EPA, the information may be made available to the public without notice to the business.

*2. NSO Financial Reporting Overview*

2.1 Revenue and Cost Assignment. The amounts assigned to operations of the smelter subject to this NSO application should include (1) revenues and costs directly attributable to the smelter's operating activities and (2) indirect operating costs shared with other segments of the firm to the extent that a specific causal and beneficial relationship can be identified for the allocation of such costs to the smelter. Do not allocate revenues and costs associated with central administrative activities for which specific causal and beneficial relationships to the activities of the smelter cannot be established. Nonallocable items include, but are not restricted to, amounts such as dividend and interest income on centrally administered portfolio investments, central corporate administrative office expenses and, except for schedules supporting the Profit Protection

Test, interest on long-term debt financing arrangements. Provide a detailed explanation of amounts classified as nontraceable on a separate schedule and attach as part of Exhibit B.

2.2 Transfer Prices on Affiliated Part Transactions. Certain transactions by the smelter subject to an NSO application may reflect sales to or purchases from ''affiliated'' customers or suppliers with whom the smelter has a common bond of ownership and/or managerial control. In preparing this application, affiliated party transactions shall be defined as transactions with any entity that the firm, or its owners, controls directly or indirectly either through an ownership of 10 percent or more of the entity's voting interests or through an exercise of managerial responsibility. Applicants must attach as part of Exhibit B supporting schedules explaining the pricing policies established on affiliated party transactions incorporated in the financial reporting schedules.

Prices on inter-segment material and product transfers within a firm, or on external purchases from and sales to other affiliated suppliers and customers, may differ from the prices on comparable transactions with unaffiliated suppliers and customers. In this event, applicants also must present in the Exhibit B supporting schedules and incorporate in the NSO financial reporting schedules appropriate adjustments for restating affiliated party transactions. Affiliated party transactions must be restated at either (a) equivalent prices on comparable transactions with unaffiliated parties if such price quotations can be obtained or (b) prices that provide the selling entity with a normal profit margin above its cost of sales if a meaningful comparison with unaffiliated transaction prices cannot be established.

A ''normal'' profit margin is defined as the gross operating profit per dollar of operating revenue that will provide an average after-tax rate of return on permanent capital (total assets less current liabilities). This average rate of return is defined differently for the historical and forecast periods. The applicant must use a rate of return of 8.0 percent for the *historical* period. This figure is based on a historical average earned rate of return for the nonferrous metals industry.[1] EPA may update this figure periodically. The updates will be available in the rulemaking docket or from the INFORMATION CONTACT noted in the FEDERAL REGISTER. For the *forecast* period, the applicant must use a rate of return equal to the current weighted average cost of capital for the nonferrous metals industry, as computed in Section 2.6.

[1]The derivation of this figure is explained in two memoranda to EPA (Item Nos. II-A-1 and IV-A-6a in EPA Docket No. A-82-35).

Forecast smelting charges for integrated smelters can be computed from forecast market smelting charges. Integrated copper smelters may use as the basis of their forecast revenues the forecast copper smelting charges provided by EPA, adjusted as described in Section 2.4.1. An applicant may submit other forecasts, providing the forecast methodology is in accordance with the guidelines in Section 2.5 and fully documented as part of Exhibit B.

2.3 Forecasting Requirements. NSO applicants must provide the Agency with financial forecasts in Schedules B.1 through B.6 and C.1 through C.2. Applicants requesting either a temporary or permanent waiver from interim constant control requirements also must provide an additional set of financial forecasts in Schedules D.1 through D.4.

2.3.1 Forecast Period. The forecast period must include at least two full years following completion and startup of the required pollution control system. The forecast period shall be from 1984 through 1990 for an NSO application filed in 1984. If an application is filed in a later year, the 1984 through 1990 period should be adjusted accordingly. All references in this appendix to the period 1984 through 1990 should be interpreted accordingly.

2.3.2 Forecast Adjustment by Control Case. Some line items that have the same title in several schedules may contain different information because they are based on different assumptions regarding pollution controls. Production interruptions or curtailments due to the installation of pollution control facilities may require adjustments to certain revenue and cost estimates in the respective control cases. For example, production curtailments associated with supplementary control systems may be the basis for the pre-control case, yet are eliminated when constant controls replace supplementary control systems in the constant controls case. The application of pollution control techniques that involve process changes in the smelter's operations (e.g., conversion to flash smelting) also may require specific forecasts by applications of associated impacts on incremental operating revenues and costs.

2.3.3 Nominal Dollar Basis. Applicants must make their financial forecasts in terms of nominal dollars. Forecasts of selected parameters provided by EPA will furnish guidelines to an applicant in preparing the required cost and revenue estimates. In particular, copper smelting charges provided in nominal-dollar terms must be used directly by the applicant as given; i.e., the stipulated charge estimates should not be inflated.

2.3.4 Tolling Service Equivalent Basis. Applicants must express all revenue forecasts on a tolling service equivalent basis. Thus,

forecast revenues are computed as the product of the forecast quantity of processed concentrate, the forecast average product grade of the concentrate (the percent of metal in the concentrate), and the forecast smelting charge. Smelters that are not tolling smelters and that do not use the copper smelting charges provided by EPA (as described in Section 2.4.1) can forecast a smelting charge from forecast product grade of the concentrate, percent recovery, and product and concentrate prices. The forecast prices and derivation of the smelting charge must be in accordance with the guidelines in Section 2.5, and the methodology must be fully documented in Exhibit B.

2.4 EPA Furnished Forecast Data. In making projection for the period 1984 through 1990, applicants must, except as noted below, use the indices provided by EPA. The table below presents yearly values for each index (expressed as annual percentage rates of change) to be used by smelters applying for an NSO before January 1, 1985. If forecasts are needed for 1991 and EPA has not provided new forecasts, applicants should use the Data Resources, Inc. forecasts for 1991 (Docket Item No. IV-A-6c) and the average of CRU's forecasts for 1989 and 1990 (expressed in 1991 dollars).

| | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 |
|---|---|---|---|---|---|---|---|
| Copper smelting charge [1] (cents per pound) | 14.5 | 14.6 | 16.0 | 15.3 | 15.3 | 15.5 | 15.4 |
| Annual Percentage Rates of Change | | | | | | | |
| Wages | 5.0 | 5.7 | 5.8 | 6.1 | 6.4 | 6.7 | 7.0 |
| Energy prices: | | | | | | | |
| Electricity | 7.0 | 8.8 | 8.1 | 8.3 | 7.1 | 4.9 | 5.5 |
| Natural gas | 3.6 | 5.7 | 9.3 | 8.7 | 9.2 | 8.0 | 8.4 |
| Coal | 5.1 | 7.0 | 8.9 | 9.0 | 9.7 | 9.7 | 9.7 |
| Fuel oil | 1.6 | 4.2 | 7.7 | 6.8 | 9.8 | 9.5 | 9.9 |
| GNP price deflator | 4.8 | 5.0 | 5.0 | 5.2 | 5.8 | 5.8 | 5.9 |

[1] Reference charge for calculating smelter-specific copper smelting charges as described in Section 2.4.1.

2.4.1 Copper smelting charge. EPA will supply a forecast of reference copper smelting charges. These charges, which are f.o.b. U.S. mine, are based on an estimate of export smelting charges and on the differential value of copper in the U.S. and the world market. They must be used in forecasting unaffiliated party revenues for the period following the expiration of existing contracts and in forecasting affiliated party revenues for the entire forecast period. The applicant may submit its own smelting charge forecast for the post-contract period, provided that such forecast is in accordance with the guidelines in Section 2.5 and fully documented and substantiated as part of Exhibit B.

The EPA forecast export charge represents the world market copper smelting charge with copper valued at the London Metal Exchange (LME) copper price. This charge serves as the reference charge for the applicant copper smelter in calculating its smelting charges. Applicant copper smelters must derive their smelting charges from this world market charge as described in paragraph (a) below.

The applicant may adjust the derived smelter-specific smelting charge to account for other factors, provided the adjustments are fully documented as part of Exhibit B. An example of such a factor is the unit deduction for metallurgical losses in smelting. Adjustment for this factor is discussed in paragraph (b) below.

(a) The derivation of a smelter-specific smelting charge from the world market charge is based on assumptions regarding transportation costs and the U.S. producer-world copper price differential. The EPA forecast export charge is the forecast smelting charge available at a Japanese smelter, with copper valued at the London Metal Exchange copper price. The charge includes no freight costs, which must be paid by the mine. A U.S. smelter determines its smelting charge to a mine by meeting the combined world market smelting charge, adjusted to reflect copper valued at the U.S. producer price, and the transportation charge from the mine to the Japanese smelter. This combined price is the highest that a mine is willing to pay for smelting.

The smelter's net smelting charge is equal to the combined world smelting charge, adjusted to the U.S. producer price for copper (i.e., the export forecast charge plus the U.S. producer price premium), and the transportation cost between the mine and a Far East smelter, minus the cost of transporting the concentrate between the mine and the applicant smelter.

The applicant smelter's net smelting charge for concentrate from an individual mine is computed by first adding the U.S. producer Price-LME world price differential to the EPA-supplied forecast. The cost of transporting copper from the U.S. mine to the Far East is then added to this figure. The

net smelting charge is obtained by subtracting from this total the cost of transporting copper from the mine to the applicant smelter. In making these calculations, an applicant must supply (and fully document in Exhibit B), the freight cost between the mine and the Far East and between the mine and the smelter. This freight cost must be converted to nominal dollars of the respective forecast years by applying the GNP percentage price change forecasts supplied by EPA or smelter-provided forecasts of transportation price changes. The smelter-provided forecasts of transportation price changes must comply with guidelines regarding such forecasts in Section 2.5.

An applicant must use a 3 cent per pound U.S. producer price premium (relative to the LME price) in calculating the smelter's net smelting charge. The applicant may substitute its own forecasts of the U.S. producer price premium if it can substantiate such forecasts in accordance with the guidelines in Section 2.5 regarding applicant-provided smelting charge forecasts of principal products. All supporting documentation for such applicant-supplied forecasts must be supplied in Exhibit B. Any updates of the producer price premium will be available in the rulemaking docket or from the INFORMATION CONTACT noted in the FEDERAL REGISTER.

The following two representative examples illustrate this methodology for making the transportation and U. S. producer price premium adjustment.

(1) The applicant smelter, located in Arizona, obtains concentrate from an adjacent mine. The freight charge from mine to smelter is zero. The mine is willing to pay the applicant smelter an amount no higher than the sum of the world market smelting charge (adjusted for the copper value differential) and the transportation cost of shipping copper from the mine to the Far East. This combined cost is the net charge received by the applicant smelter. If the export smelting charge is 12 cents per pound and the freight cost between the mine and the Far East is 13 cents per pound, the applicant smelter would calculate a net smelting charge equal to 28 cents: 12 cents plus 3 cents (for the U.S. producer price premium) plus 13 cents (for the freight cost between the mine and the Far East).

(2) The applicant smelter obtains concentrate from a nonadjacent mine. The mine will pay a charge no higher than the total market smelting charge, valued at the U.S. producer price, and the transportation costs between the mine and a Far East smelter. The applicant's net smelting charge is equal to this combined cost minus the transportation costs for shipping the concentrate between mine and applicant smelter.

Suppose that the mine to Far East freight charge is 13 cents per pound and the mine to applicant smelter freight charge is 4 cents per pound. If the export smelting charge is 12 cents per pound, the net smelting charge is equal to 24 cents per pound: 12 cents plus 3 cents (for the U.S. producer price premium) plus 13 cents (for the freight cost to the Far East) minus 4 cents (for the freight cost to the applicant smelter).

(b) The EPA forecast charges are based on a one unit deduction for metallurgical losses. This means that if a concentrate grades 25 percent copper, the mine is only credited with 24 percent for metal return. The one unit deduction on 25 percent concentrate is equivalent to a 96 percent payment for contained copper. Should a smelter recover less than 96 percent, its revenue would be less than the EPA forecast smelting charge. Should a smelter recover more than 96 percent, its revenue would be greater than the EPA forecast smelting charge.

2.4.2 Indices (Annual Percentage Changes). These indices, which are expressed as annual percentage rate changes in price (wages, energy prices, and GNP price deflator) must be used only for estimating the rate of price increases for the forecast period following the expiration of the applicant's current contracts. The applicant may use alternative forecasts of annual percentage changes for the forecast period following the expiration of current contracts, if justification is provided. Any such alternative forecasts must be prepared by a widely-recognized forecasting authority with expertise comparable to that of the forecaster relied upon by EPA. In addition, the documentation of these forecasts must be comparable to that provided by EPA's forecaster.

The wage indices are to be applied to wage paid to manufacturing labor. The energy price indices are to be applied to prices of the respective energy products. The GNP price deflators are to be applied to prices for non-metal, non-labor, and non-energy inputs.

2.5 Applicant Generated Forecasts. Within the specified limitations, applicants may submit a method of forecasting smelting charges and by-product, co-product and other prices. The method selected must be explained and unit prices or costs provided where applicable. The forecast elements must be compatible with an applicant's historical cost and revenue elements to permit direct comparisons of historical and forecast data. Applicants must attach as part of Exhibit B appropriate schedules explaining variances between forecast and historical unit costs for the smelter.

Forecasts of the smelting charges of the smelter's principal product (i.e., copper, lead, zinc, etc.) may be prepared either by an independent forecasting authority or by the smelter's in-house personnel. If the forecasts are prepared by an independent forecasting authority, the following conditions must be satisfied: (1) The forecasting authority must

have expertise comparable to that of the forecaster relied upon by EPA. (2) As much documentation of the forecasting methodology as can reasonably be obtained must be made available to EPA. Such documentation must, at a minimum, be comparable to the documentation supporting EPA smelting charge forecasts.[2]

If the smelting charge forecasts are prepared by in-house personnel, the following conditions must be met: (1) The in-house forecasts must be certified as being based on sound methodology by an independent forecasting authority with expertise comparable to that of the forecaster who prepared the EPA-supplied smelting charges. The independent forecasting authority shall also provide a brief explanation of the basis for the conclusion reached in the certification. (2) The smelter owner shall provide EPA with the documentation of the forecasting methodology employed, which must at a minimum be comparable to the extent of documentation supporting EPA's smelting charge forecasts. The smelter owner shall also make available upon request by EPA such additional documentation of the methodology and underlying data as EPA considers appropriate for evaluation of the forecasts.

Forecasts of freight cost changes, which are applied to the freight costs used in calculating a smelter's net smelting charges, must be prepared by a widely-recognized forecasting authority. The forecaster's expertise must be comparable to that of the forecaster relied upon by EPA in forecasting the annual percentage changes in wages, energy prices, and GNP. The documentation of these forecasts must be comparable to that provided by EPA's forecaster.

To the maximum extent practicable, byproduct, co-product and (when applicable) unaffiliated smelting charges must be stated at market prices adjusted to f.o.b. smelter. Adjustments of these pricing bases must be made to reflect differences in grades and types of production. All adjustments must be consistent with expected sales, grades and types of concentrate processed. Applicants must attach as part of Exhibit B schedules describing and explaining the methods used to forecast these revenue items and the adjustments required for these revenue forecasts.

Applicants must explain fully any changes from the historical data that are required to forecast labor productivity, ore-concentrate grade and composition, materials and energy consumption per unit of output, yield rates and other physical input/output relationships.

Existing contractual terms must be used in forecasting those sales or input costs or prices to which the applicant is committed by contracts. The use of contract-dictated prices must be disclosed and supported by attaching as part of Exhibit B the terms and duration of labor and other supplier arrangements.

Cost of compliance estimates need not be to the accuracy of final design/bid estimates; feasibility grade estimates will be acceptable. Updated cost of compliance estimates used in internal five year plans or specially prepared estimates of costs of compliance will generally be satisfactory.

2.6 Weighted Average Cost of Capital for Nonferrous Metal Producers. The industry average cost of capital is a weighted average of the rates of return for equity and debt. Its components are the interest rate and the return on equity specific to the nonferrous metals industry.

2.6.1 Computation.[3] The applicant must compute the cost of capital according to the following formula:

$$R = (0.65 \times E) + (0.182 \times I)$$

where

R = weighted average cost of capital
E = return on equity
I = interest rate.

The components are calculated as follows.

(a) *Return on equity for the nonferrous metals industry*. The 20 year Treasury bond yield to maturity plus a risk premium of 8.6 percent.

(b) *Interest Rate*. The 20 year Treasury bond yield to maturity plus a risk premium of 3.0 percent.

(c) *Source of the 20 Year Treasury bond yield*. *Federal Reserve Bulletin*, most recent monthly issue. Use the average yield for the most recent full month.

2.6.2 Discount Factor. The discount factor corresponding to the weighted average cost of capital for any forecast year is computed according to the following equation:

$$DF = \frac{1}{(1+R)} N$$

where

DF = discount factor
R = weighted average cost of capital
N = the number of years in the future (e.g., for the applicant applying in 1984, N = for the forecast year 1985).

The horizon value, which is described in Section 2.7, is computed as of 1990, the end of the detailed forecast period. The discount factor to be applied to the horizon value is

[2] Documentation of the EPA forecasts is provided as part of Item NO. IV-A-2 in EPA Docket No. A-82-35.

[3] The derivation of the formula and the basis of the parameters are explained in two memoranda to EPA (Item Nos. II-A-1 and IV-A-6a in EPA Docket No. A-82-35).

the same as for any other 1990 figure. For example, if the application is made in 1984, the value of N is 7.

2.7 Horizon Value. The horizon value is the present value of a stream of cash flows or net income for 15 years beyond the last forecast year. Applicants must compute the horizon value by capitalizing the average forecast value of the last two forecast years using the current real weighted cost of capital. The line item instructions for schedules having a horizon value entry will specify the values to be capitalized.

The applicant averages the values of the last two years after expressing both values in terms of the last year's dollars. The two-year average value is then multiplied by 9.6. This is the factor associated with capitalizing a 15 year value stream at the current *real* weighted cost of capital of 6.2 percent.

Applicants must use a separate schedule to calculate the horizon value for the Rate of Return Test and the Interim Controls Test (Schedule C.5 and D.7, respectively). These separate schedules adjust for potential overstatements in the horizon value cash flows that may be caused by control equipment depreciation reported for tax purposes.

2.8 Data Entry

2.8.1 Rounding. All amounts (including both dollar values and physical units) reported in the schedules and exhibits accompanying this application must be rounded to the nearest thousand and expressed in thousands of dollars or units unless otherwise indicated in the instructions.

2.8.2 Estimates. Where an applicant's records cannot produce the specific data required by this application, the use of estimates will be allowed if a meaningful estimate can be made without significant distortion of the reported results. Data estimates must be supported by attaching on a separate sheet of paper as a part of Exhibit B an explanation identifying where such estimates are used and showing explicitly how the estimates were made.

2.8.3 Missing Data. Applicants must provide, where applicable, all operating and financial data requested by this application. Only substantially complete applications can be accepted for processing by the Agency. Questions concerning data entries for which information is not provided by or cannot reasonably be estimated from the applicant's existing accounting records should be addressed to the EPA Contact for NSO Inquiries.

2.8.4 Historical Period. The annual data requested in the historical schedules, Schedules A.1 through A.4, must be reported for each of the five fiscal years immediately preceding the year in which this application is filed. The historical period shall be from fiscal years 1979 through 1983 for an NSO application filed in 1984. If an application is filed in a later year, the references in this appendix to the period 1979 through 1983 should be interpreted accordingly.

2.9 Use of schedules. All applicants must complete Schedules A.1 through A.4, which record historical revenues, cost, and capital investment data. These schedules will be used by EPA to assist in evaluating forecast data. Completion of the remaining schedules depends on the test required of the applicant.

2.9.1 NSO Eligibility. An NSO applicant must pass one of the following two tests and complete the corresponding schedules.

(a) *Profit Protection Test*. The applicant must complete Schedules B.1 through B.7 to determine eligibility under the Profit Protection Test. Schedules B.1 and B.2 report the base case (without constant controls) revenue and cost forecast, respectively, and Schedule B.3 summarizes Schedules B.1 and B.2. Base case production forecasts should reflect any production curtailments associated with interim controls currently (preforecast) installed on smelters. Schedules B.4 and B.5 report the revenue and cost forecast, respectively, for the constant controls case, and Schedule B.6 summarizes Schedules B.4 and B.5 for the Profit Protection Test.

Schedule B.7 presents the calculations for the Profit Protection Test. The applicant enters the forecast profits from Schedules B.3 and B.6. The present value of the forecast profits is then computed for each case. If the present value of forecast pre-tax profits with constant controls is less than 50 percent of the present value of forecast pre-tax profits without controls (base case) the smelter passes the test and is eligible for an NSO. The smelter also passes the test if the present value of forecast pre-tax profits without controls (base case) is negative.

(b) *Rate of Return Test*. The applicant must complete Schedules B.4, B.5, and C.1 through C.5 to determine eligibility under the Rate of Return Test. Schedules B.4 and B.5 report the revenue and cost forecast, respectively, for the constant controls case, and Schedule C.1 summarizes Schedules B.4 and B.5 for the Rate of Return Test. Schedule C.2 reports forecast sustaining capital investment for the constant controls case. Schedule C.3 reports historical net investment for the most recent fiscal year expressed in constant dollars, i.e., dollars of the year in which the application is made.

Schedule C.4 presents the calculations for the Rate of Return Test. The applicant reports in Schedule C.4 the forecast cash flows from Schedules C.1 and C.2 and the horizon value from Schedule C.5, computes their present value, and subtracts the value of invested capital in constant dollars (taken from Schedule C.3) to yield net present value. If the net present value is less than zero, the smelter passes the test and is eligible to receive an NSO. This result indicates that the smelter is expected to earn a rate of

return less than the industry average cost of capital.

2.9.2 Interim Control Waivers. An applicant for a waiver from interim controls must complete either a portion or all of Schedules D.1 through D.7, depending on whether the application is for a temporary or permanent waiver.

(a) *Temporary Waiver from Interim Controls Test*. The applicant must complete Schedules D.1 through D.3 to establish eligibility for a temporary waiver from interim controls. Schedules D.1 and D.2 report forecast revenue and cost data under the assumption of installation of interim constant control equipment and no installation of any additional $SO_2$ controls that the smelter would otherwise be required to install but for the issuance of the NSO. Schedule D.3 summarizes Schedules D.1 and D.2 and calculates gross operating profit. If gross operating profit is negative for any year during which the NSO is in effect, the applicant is eligible for a temporary waiver.

(b) *Permanent Waiver from Interim Controls Test*. The applicant must complete Schedules D.1 through D.7. All schedules except for Schedule D.5 must be completed twice, based on two alternative assumptions: (1) installation of interim constant control equipment, no installation of any additional $SO_2$ controls that the smelter would otherwise be required to install but for the issuance of the NSO, and closure of the smelter after January 1, 1988; and (2) installation of interim constant control equipment, installation of any additional $SO_2$ controls required to comply with the smelter's SIP emission limitation by January 2, 1988, and continued operation of the smelter after January 1, 1988.

Schedules D.1 and D.2 report forecast revenue and cost data under each assumption. Schedule D.3 summarizes Schedules D.1 and D.2, and Schedule D.4 reports forecast sustaining capital under each assumption. Schedule D.5 reports cash proceeds from liquidation.

Schedule D.6 presents the calculations for the permanent waiver test. In Schedule D.6, the applicant reports cash flow projections from Schedules D.3 and D.4 and the horizon value from Schedule D.7, computes their present value and subtracts the current salvage value (taken from Schedule D.5) to yield net present value. The higher of the two net present value figures computed under the two alternative assumptions must be used in the test. If the higher net present value figure is negative, the applicant is eligible for a permanent waiver.

2.10 Use of exhibits. In addition to data required by the schedules included in this application, the following information must be attached as exhibits.

2.10.1 Exhibit A. Background information on the firm's organizational structure and its associated accounting and financial reporting systems for primary nonferrous activities. This information must include, where applicable, the firm's:

(a) Operating association with an ownership control in consolidated subsidiaries, unconsolidated subsidiaries, joint ventures and other affiliated companies.

(b) Organizational subdivision of its primary nonferrous activities into profit centers, cost centers and/or related financial reporting entities employed to control the operation of its mines, concentrators, smelters, refineries and other associated facilities.

(c) Material and product flows among the smelter subject to this NSO application, other integrated facilities and its affiliated suppliers and/or customers. In the case of integrated facilities, applicants must provide process flow diagrams depicting the operating interrelationships among its mines, concentrators, smelters, refineries and other integrated facilities. For both integrated and nonintegrated facilities, applicants also must describe the proportion contributed to its primary nonferrous activities by material purchases from and product sales to affiliated suppliers and customers.

(d) Annual operating capacity over the five most recent fiscal years for the smelter subject to this application. Operating capacity must be defined in terms of the total quantity of throughput that could have been processed with the available facilities after giving appropriate allowance to normal downtime requirements for maintenance and repairs. Operating capacity data also must consider both capacity balancing requirements among processing steps and annual processing yield rates attainable for each facility.

(e) Weighted average analysis of concentrates processed and tonnage produced annually over each of the five most recent fiscal years by the smelter subject to this application.

(f) Accounting system and policies for recording investment expenditures, operating revenues, operating costs and income taxes associated with its primary nonferrous activities. Applicants also must provide a complete description of allocation techniques employed for assigning investments, revenues, costs and taxes to individual profit, cost of departmental centers for which costs are accumulated. Applicants must further indicate the relationship of cost and/or departmental accounting entities to the firm's established profit centers.

(g) Annual five-year operating and capital expenditure plans (or budgets) by individual nonferrous profit center. These documents must include previous plans prepared for the five preceding fiscal years as well as the current one-year and five-year operating and

capital expenditure plans. At least the current one-year and five-year plans must provide a specific breakdown of investment expenditures and operating costs associated with the operation and maintenance of each profit center's existing and proposed pollution control facilities.

2.10.2 Exhibit B. Supplemental description and explanation of items appearing in the financial reporting schedules. Other parts of Section 2 and the detailed instructions for the Schedules specify the information required in Exhibit B.

2.10.3 Exhibit C. Financial data documentation. Applicants must document annual balance sheet, income statement and supporting data reported for the firm's preceding five fiscal years or for that portion of the past five years during which the firm engaged in smelter operations. This documentation must be provided by attaching to the application:

(a) SEC 10–K reports filed by the parent corporation for each of the preceding five fiscal years.

(b) Certified financial statements prepared on a consolidated basis for the parent corporation and its consolidated subsidiaries. This requirement may be omitted for those years in which SEC 10–K reports have been attached to this Exhibit.

(c) Business Segment Information reports filed with the Securities and Exchange Commission by the firm for each of the preceding five years (as available).

Schedule A.1—Historical Revenue Data

*General*. Use Schedule A.1 to report annual historical revenue data for fiscal years 1979 through 1983. Revenues include product sales and associated operating revenues, net of returns and allowances, from smelter sales and/or transfers of copper, lead, zinc and molybdenum or other nonferrous metal products and tolling services to both unaffiliated and affiliated customers. The line items in Schedule A.1 are explained in the following instructions.

*Lines 01, 14, 27 and 40—Primary Nonferrous Product Sales*. Report for each year the total quantity of copper, lead, zinc and molybdenum or other nonferrous metal product sales.

*Lines 02, 15, 28 and 41—Unaffiliated Customer Sales*. Report for each year the respective quantities of copper, lead, zinc and molybdenum or other nonferrous metal product sales to unaffiliated customers.

*Lines 03, 16, 29 and 42—Unaffiliated Customer Revenues*. Report for each year the total operating revenues derived from smelter sales of copper, lead, zinc and molybdenum or other nonferrous metals to unaffiliated customers.

*Lines 04, 17, 30 and 43—Unaffiliated Customer Prices*. Report for each year the average unit price received on smelter sales of copper, lead, zinc and molybdenum or other nonferrous metals to unaffiliated customers. The prices are computed as operating revenues reported on Lines 03, 16, 29 and 42 divided by the quantities reported on Lines 02, 15, 28 and 41, respectively.

*Lines 05, 18, 31 and 44—Average Product Quality Grade*. Report for each year the average quality rating assigned to copper, lead, zinc and molybdenum or other nonferrous metal products purchased by the smelter's unaffiliated customers.

*Lines 06, 19, 32 and 45—Affiliated Customers Sales*. Report for each year the respective quantities of copper, lead, zinc and molybdenum or other nonferrous metal product sales to affiliated customers.

*Lines 07, 20, 33 and 46—Affiliated Customer Revenues*. Report for each year the total operating revenues derived from smelter sales of copper, lead, zinc and molybdenum or other nonferrous metals to affiliated customers. These revenues should be stated at prices equivalent to those received on comparable sales to unaffiliated customers as described in Section 2.2. Attach as part of Exhibit B an explanation of the methodology used to state affiliated customer revenues.

*Lines 08, 21, 34 and 47—Affiliated Customer Prices*. Report for each year the average unit price received on smelter sales of copper, lead, zinc and molybdenum or other nonferrous metals to affiliated customers. The prices are computed as operating revenues reported on Lines 07, 20, 33 and 46 divided by the quantities reported on Lines 06, 19, 32 and 45, respectively.

*Lines 09, 22, 35 and 48—Average Product Quality Grade*. Report for each year the average quality rating assigned to copper, lead, zinc and molybdenum or other nonferrous metal products purchased by the smelter's affiliated customers.

*Lines 10, 23, 36 and 49—Total Primary Product Revenues*. Report for each year total operating revenues derived from the smelter's sales to unaffiliated and affiliated customers of copper (Lines 03+07), lead (Lines 16+20), zinc (Lines 29+33) and molybdenum or other nonferrous metals (Lines 42+46).

*Lines 11, 24, 37 and 50—Transfer Price Adjustments*. Report for each year operating revenue adjustments required to equate affiliated customer transfer prices with unaffiliated customer market prices on smelter sales of copper, lead, zinc and molybdenum or other nonferrous metals. Attach as part of Exhibit B an explanation of the method used for restating transfer prices where such adjustments are necessary.

*Lines 12, 25, 38 and 51—Other Revenue Adjustments*. Report for each year sales returns and allowances and other adjustments applicable to the smelter's revenues derived from copper, lead, zinc and molybdenum or other nonferrous metal product sales. Attach as

part of Exhibit B a schedule reporting the types and amounts of such adjustments.

*Lines 13, 26, 39 and 52—Adjusted Product Revenues.* Enter for each year the sums of Lines 10 through 12 for adjusted copper sales (Line 13), Lines 23 through 25 for adjusted lead sales (Line 26), Lines 36 through 38 for adjusted zinc sales (Line 39) and Lines 49 through 51 for adjusted molybdenum or other nonferrous metal sales (Line 52).

*Line 53—Primary Metal Revenues.* Enter for each year the sum of Lines 13, 26, 39 and 52.

*Line 54—Toll Concentrates Processed.* Report for each year the total quantity of toll concentrates processed.

*Lines 55 to 58—Customer Toll Revenues.* Report for each year the quantity of toll concentrates processed for unaffiliated customers (Line 55), total operating revenues derived from this processing (Line 56), average price charged per ton of concentrate processed (Line 57=Line 56/55) and the average quality rating assigned to toll concentrates processed for unaffiliated customers (Line 58).

*Lines 59 to 62—Affiliated Customer Toll Revenues.* Report for each year the quantity of toll concentrates processed for affiliated customers (Line 59), total operating revenues derived from such processing (Line 60), average price charged per ton of concentrate processed (Line 61=Line 60/59) and the average quality rating (Line 62) assigned to toll concentrates processed for affiliated customers.

*Line 63—Tolling Service Revenues.* Enter for each year the total of amounts reported on Lines 56 and 60.

*Line 64—Transfer Price Adjustments.* Report for each year operating revenue adjustments required to equate affiliated customer transfer prices with market prices charged to unaffiliated customers on the smelter's tolling services. Attach as part of Exhibit B an explanation of the method used for restating transfer prices where such adjustments are necessary.

*Line 65—Other Revenue Adjustments.* Report for each year other adjustments applicable to the smelter's tolling service revenues. Attach as part of Exhibit B a schedule reporting the types and amounts of such adjustments.

*Line 66—Adjusted Tolling Service Revenues.* Enter for each year the total of Lines 63 through 65.

*Line 67—Co-Product Revenues.* Report for each year the net revenues from sales of co-products derived from the smelter's operations. Attach as part of Exhibit B a schedule showing by individual type of co-product, the quantity produced and sold, market price per unit of sales and total revenues derived from the co-product sales.

*Line 68—Pollution Control By-product Revenues.* Report for each year revenues from the sale of by-products derived from operation of the smelter's pollution control facilities. Attach as part of Exhibit B a schedule showing by type of by-product produced, the quantity of output, market price received per unit of output sold and total revenue derived from the by-product sales.

*Line 69—Other By-product Revenues.* Report for each year revenues from the sales of gold, silver and other by-products derived from the smelter's operations. Attach as part of Exhibit B a schedule providing additional documentation as specified in the instruction for Line 68.

*Line 70—Total Co-product and By-product Revenues.* Enter for each year the total of Lines 67 through 69.

Schedule A.2—Historical Cost Data

*General.* Use Schedule A.2 to report annual historical cost and input quantities for smelter operations for fiscal years 1979 through 1983. The line items in Schedule A.2 are explained in the following instructions.

*Line 01—Total Quantity Purchased.* Report for each year the total quantity of concentrates purchased by the smelter. This will be sum of Lines 02 and 06. Do not include the quantity of toll concentrates.

*Line 02—Quantity Purchased.* Report for each year the total quantity of concentrates purchased from unaffiliated suppliers by the smelter. Attach as a part of Exhibit B a description of the types and grades of these concentrates. Do not include the quantity of toll concentrates.

*Line 03—Concentrate Cost.* Report for each year the outlays paid to unaffiliated suppliers for concentrates. Attach as part of Exhibit B an explanation of the method(s) used in determining these outlays and relationship between concentrate prices and the types and grades of concentrates purchased from unaffiliated suppliers.

*Line 04—Average Unit Price.* Report for each year the average unit price paid for purchases of concentrates from unaffiliated suppliers. Generally, this value will be equivalent to Line 03 divided by Line 02. If this equivalency does not hold, attach as a part of Exhibit B an explanation of the variance.

*Line 05—Average Concentrate Grade.* Report for each year the average concentrate grade of concentrates purchased from unaffiliated suppliers. Attach as part of Exhibit B an explanation of this average. The average should correspond to the average price reported in Line 04.

*Line 06—Quantity Purchased.* Report for each year the total quantity of concentrates purchased from affiliated suppliers by the smelter. Attach as part of Exhibit B a description of the types and grades of these concentrates. Do not include the quantity of toll concentrates.

*Line 07—Concentrate Cost.* Report for each year the actual outlays paid to affiliated

suppliers for concentrates. Attach as part of Exhibit B an explanation of the method(s) used in determining these outlays and relationship between concentrate prices and the types and grades of concentrates purchased from affiliated suppliers. Do not reflect any adjustments to market prices here.

*Line 08—Average Unit Price.* Report for each year the average unit price paid for purchases of concentrates from affiliated suppliers. Generally, this value will be equivalent to Line 07 divided by Line 06. If this equivalency does not hold, attach as part of Exhibit B an explanation of the variance.

*Line 09—Average Concentrate Grade.* Report for each year the average concentrate grade of concentrates purchased from affiliated suppliers. Attach as part of Exhibit B an explanation of this average. The average should correspond to the average price reported in Line 08.

*Line 10—Total Concentrate Cost.* Enter for each year the sum of Lines 03 and 07.

*Line 11—Transfer Price Adjustments.* Enter for each year the amounts required to adjust outlays paid to affiliated suppliers to market value. Refer to Section 2.2 for instructions on the restatement of affiliated party transactions. Attach as part of Exhibit B a description and the computations of any required cost adjustments.

*Line 12—Other Cost Adjustments.* Enter for each year the amounts of any other cost adjustments required such as freight or allowances. Attach as part of Exhibit B the identification and the derivation of these adjustments.

*Line 13—Adjusted Concentrate Cost.* Enter for each year the adjusted concentrate cost reflecting the adjustments reported in Lines 11 and 12.

*Line 14—Direct Labor Hours.* Report for each year the quantity of direct labor hours required to support the processing levels previously reported. Attach as part of Exhibit B an explanation of the labor productivity factor involved.

*Line 15—Average Hourly Wage Rate.* Report for each year the average wage rate paid per unit of direct labor input. Attach as part of Exhibit B a description of direct labor costs factors under existing labor contracts and an explanation of the method(s) used to determine wage rates.

*Line 16—Total Wage Payments.* Enter for each year the product of Lines 14 and 15.

*Line 17—Supplemental Employee Benefits.* Report adjustments required to direct labor costs for other employee compensation under supplemental benefit plans. Attach as part of Exhibit B a description of such plans and their costs and an explanation of the method(s) used to determine such costs.

*Line 18—Total Production Labor Cost.* Enter for each year the total of Lines 16 and 17.

*Lines 19, 22, 25, 28 and 31—Energy Quantities.* Report for each year the quantity of energy by type required to support the processing levels reported in the smelter's revenue. Attach as part of Exhibit B, an explanation of energy use factors and qualities considered in determining the smelter's energy requirements.

*Lines 20, 23, 26, 29 and 32—Unit Prices.* Report for each year a price paid per unit of energy input by type of energy. Attach as part of Exhibit B, a description of the energy price factors under existing energy contracts and an explanation of the method(s) used to determine unit energy prices.

*Lines 21, 24, 27, 30 and 33—Total Payments.* Enter for each year the products of quantity and prices paid for electricity (Lines 19×20), natural gas (Lines 22×23), coal (Lines 25×26), fuel oil (Lines 28×29), and other (Lines 31×32).

*Line 34—Total Energy Costs.* Enter for each year the total of Lines 21, 24, 27, 30 and 33.

Schedule A.3—Historical Profit and Loss Summary

*General.* Use Schedule A.3 to report annual revenues, cost and income taxes assignable to operation of the smelter subject to this NSO application for fiscal years 1979 through 1983. Assignable revenues and costs should include only the results of transactions either (1) directly associated with smelter operations or (2) for which the applicant can establish a causal and beneficial relationship with smelter operations pursuant to instructions in Section 2.1. The line items in Schedule A.3 are explained in the following instructions.

*Line 01—Primary Metal Sales.* Enter the totals reported in Schedule A.1, Line 40.

*Line 02—Co-Product and By-Product Sales.* Report for each year annual revenues, net or returns and allowances, derived from smelter sales and/or transfers of co-products and by-products to both unaffiliated and affiliated customers. Attach as part of Exhibit B a supporting schedule for each major co-product and by-product component of smelter revenues. Segregate the revenues reported by major co-product and by-product components into their unaffiliated customer and affiliated customer elements. Report for each component's unaffiliated and affiliated customer revenue elements the (1) average grade of product sold, (2) actual quantity sold, (3) average price per unit, and (4) total smelter revenues. Also show for each product line any adjustments required to restate transfer prices and explain the basis for such adjustments. Refer to Section 2.2 for instructions on the restatement of affiliated customer revenues.

*Line 03—Tolling Service Revenues.* Enter the totals reported in Schedule A.1, Line 53.

*Line 04—Other Operating Revenues.* Report for each year annual revenues directly associated with smelter operations that have not previously been reported on Lines 01 through 03. Attach as part of Exhibit B a schedule

showing the types and amounts of sales reported as other operating revenue. The following non-operating revenue and income items should *not* be included as other operating revenue or as a part of revenues reported on Lines 01 through 03.

Royalties, licensing fees and other income from intangibles.

Interest and dividend income on portfolio investments.

Equity in income (loss) of unconsolidated subsidiaries and affiliates.

Gain (loss) from discontinued operations and disposal of property.

Minority interest adjustment to consolidated subsidiary income.

Extraordinary items.

*Line 05—Total Operating Revenue.* Enter for each year the total of Lines 01 through 04.

*Line 06—Concentrates Processed.* Report the cost of concentrates processed and sold or transferred to unaffiliated and affiliated customers from Schedule A.2, Line 13. Concentrates purchased from unaffiliated suppliers should be valued at the actual prices paid. Concentrates purchased from affiliated suppliers should be valued at or, if necessary, restated to equivalent prices quoted by unaffiliated suppliers. If prices used to report revenues are c.i.f. and concentrate costs are f.o.b. smelter, all transportation charges paid on the smelter's or buyer's account should be excluded from smelter expense. Attach as part of Exhibit B supporting schedules showing the:

Annual value of concentrate purchases classified according to purchases from unaffiliated and affiliated suppliers.

Cost of sales adjustments to concentrate purchases for net annual additions to or withdrawals from concentrate inventories, freight-in on concentrate purchases and inventory spoilage.

Impact on cost of sales for restating, where applicable, the cost of concentrate purchases from affiliated suppliers to the equivalent prices paid to unaffiliated suppliers.

Volumes, grades and net prices of concentrate purchases from unaffiliated and affiliated suppliers by type of concentrate purchased.

Volumes, grades and net prices associated with toll concentrates processed by type of concentrate.

*Line 07—Other Materials Costs.* Report for each year annual costs incurred for flux, refractories, coke and other materials used by the smelter in its processing of concentrates. Materials purchased from unaffiliated suppliers should be valued at the actual prices paid after adjustment for transportation costs incurred. Materials purchased from affiliated suppliers should be valued at or, if necessary, restated to equivalent prices quoted by unaffiliated suppliers. Include in Exhibit B supporting schedules showing the:

Annual value of material purchases classified according to purchases from unaffiliated and affiliated suppliers.

Cost of sales adjustments to material purchases for net annual additions to or withdrawals from material inventories, freight costs on material purchases and inventory loss.

Impact on cost of sales for restating, where applicable, the costs of material purchases from affiliated suppliers to equivalent prices paid to unaffiliated suppliers.

Classification of other material costs by major cost factors for each cost component that exceeds 20 percent of any line item in the cost of sales schedule.

*Line 08—Production Labor Costs.* Report for each year total direct labor costs incurred by the smelter for processing purchased and toll concentrates, Schedule A.2, Line 18. Include in Exhibit B supporting schedules showing the:

Manhours and wage rates for major labor classifications.

Potential impact on wage rates of provision in the smelter's current labor contracts.

Explanation of major variances observed in direct labor costs over the five-year period as a result of factors such as strikes or new labor contracts.

*Line 09—Energy Costs.* Enter the totals reported in Schedule A.2, Line 34.

*Line 10—Pollution Control Costs.* Report for each year expenses incurred for operating and maintaining pollution control facilities. All by-product credits associated with pollution control facility operations should be eliminated and reported on Line 02. Depreciation and amortization charges against the smelter's pollution control facilities should be reported separately on Line 18. Attach as part of Exhibit B supporting schedules showing the:

Major pollution control cost elements with their values classified according to direct and indirect cost factors.

Techniques used to allocate indirect pollution control costs to major cost pools.

*Line 11—Production Overhead.* Report for each year the total costs for indirect labor, indirect materials and other production overhead costs associated with the smelter. Attach as part of Exhibit B a schedule showing annual overhead costs by major cost components associated with the smelter's operations. For each cost component, where appropriate, identify the quantity and unit price element of overhead costs.

*Line 12—Other Production Costs.* Report for each year annual smelter overhead and other production costs not previously reported on Lines 06 through 11. By-product credits, if any, should be eliminated and reported on

Line 02 as operating revenues. Attach as part of Exhibit B supporting schedules showing the:

Major cost elements classified according to direct and indirect production costs.

Disaggregation of major overhead cost components into their fixed and variable cost elements.

Allocation techniques used in assigning indirect overload costs to the major cost components.

Elements of overhead costs represented by purchases from affiliated suppliers and adjustments, if any, required to restate these costs on the basis of equivalent prices paid to unaffiliated supplier.

*Line 13—Total Cost of Sales*. Enter for each year the total of Lines 06 through 12.

*Line 14—Gross Operating Profit*. Enter for each year the difference between Lines 05 and 13.

*Line 15—Selling, General & Administrative (SG&A) Expenses*. Report for each year SG&A expenses attributable to the smelter's annual operating activities. Exclude those operating costs to be reported separately on Lines 16 through 21 and those costs for which causal and beneficial relationships to the smelter cannot be established. Attach as part of Exhibit B supporting schedules (1) segregating SG&A expenses by major expense components, (2) classifying the major expense components according to those costs incurred directly by smelter operations and costs allocated to the smelter from indirect cost pools, and (3) explaining the basis used for indirect cost allocations.

*Line 16—Taxes, Other Than Income Tax*. Report for each year all taxes (exclusive of Federal, State, local and foreign income taxes) assignable to the smelter's operations. Attach as part of Exhibit B, a schedule that (1) segregates these operating taxes by major component, (2) classifies each component according to direct and indirect cost elements, and (3) explains the basis used for indirect cost allocations.

*Line 17—Research Costs*. Report for each year research costs (exclusive of capitalized costs reported in Schedule A.4) that are assignable to the smelter's annual operations. Attach as part of Exhibit B a schedule (1) segregating exploration and research costs by major expense components, (2) classifying each expense component according to direct and indirect cost elements, and (3) explaining the basis used for indirect cost allocations.

*Line 18—Pollution Control Depreciation and Amortization*. Report for each year annual depreciation and amortization charges attributable to the smelter's investment in pollution control facilities and equipment. Reported charges should be computed in accordance with depreciation and amortization methods adopted for tax reporting purposes by the firm. Attach explanatory supporting schedules as part of Exhibit B.

*Line 19—Other Facility Depreciation and Amortization*. Report for each year annual depreciation and amortization charges (exclusive of charges reported on Line 18) assignable to the smelter's operations. Attach explanatory supporting schedules as part of Exhibit B.

*Line 20—Interest on Short-Term Debt*. Report for each year interest expense and associated financial charges on current liabilities in accordance with the assignment instructions in Section 2.1. Do not include interest on the portion of long-term debt due within the current year for each reporting period.

*Line 21—Miscellaneous Operating Expenses*. Report for each year any additional expenses assignable to the smelter's annual operations. Attach as part of Exhibit B a schedule (1) segregating these additional expenses into major expense components, (2) classifying each expense component according to costs incurred directly by the smelter and costs allocated to the smelter from indirect cost pools, and (3) explaining the basis used for indirect cost allocations.

*Line 22—Total Other Operating Expenses*. Enter for each year the total of Lines 15 through 21.

*Line 23—Income from Operations*. Enter for each year the difference between Lines 14 and 22.

*Line 24—Gain/(Loss) from Disposition of Property*. Report net gains or losses recognized during each year from disposition of property, plant and equipment. Report such gains or losses in accordance with the firm's normal practice for certified financial statement reporting. If such gains or losses are not significant and are classified otherwise, no reclassification need be made. A note to this effect must be included in Exhibit B.

*Line 25—Miscellaneous Income and Expenses*. Report minority interest in income, foreign currency translation effects, and other nonoperating income and expenses directly assignable to the smelter and not recognized elsewhere on this schedule. Report such items in accordance with the accounting methods used for certified financial reporting purposes.

*Line 26—Total Other Income and Expenses*. Enter for each year the sum of Lines 24 and 25.

*Line 27—Net Taxable Income*. Enter for each year the difference between Lines 23 and 26.

### Schedule A.4—Historical Capital Investment Summary

*General*. Use Schedule A.4 to report annual end-of-period asset investments and current liabilities for fiscal years 1979 through 1983. These figures must correspond with the revenues and costs associated with operation of the smelter subject to this NSO application as reported in Schedule A.3.

The amounts assigned to the subject smelter should include both (1) investments and liabilities directly identifiable with the smelter's operating activities and (2) asset investments shared with other segments to the extent that a specific causal and beneficial relationship can be established for the intersegment allocation of such investments. Do not allocate to the smelter the costs of assets maintained for general corporate purposes. Provide a detailed explanation of amounts classified as nontraceable on a separate schedule and attach as part of Exhibit B.

Applicants shall also restate trade receivables and payables for transfer price adjustments on the smelter's transactions with affiliated customers. The line items in Schedule A.4 are explained in the following instructions.

*Line 01—Cash on Hand and Deposit.* Report for each year total cash balances assignable to the smelter's operations at the end of each year on the basis of causal and beneficial relationships with total corporate activities. Attach as part of Exhibit B in explanation of the basis used for allocation.

*Line 02—Temporary Cash Investments.* Report for each year temporary cash investments in time deposits or other short-term securities. Include only those investments either held by the smelter to meet current-period tax payments or other budgeted expenditures specifically identifiable with the smelter's continued operation. Exclude any temporary cash investments for which no specific future outlay requirement can be identified.

Attach as part of Exhibit B a schedule classifying temporary cash investments according to identifiable budgeted expenditure requirements.

*Lines 03 and 04—Net Trade Receivables.* Report for each year trade accounts and notes, net of reserves for uncollectible items, assignable to the smelter in relation to its unaffiliated (Line 03) and affiliated (Line 04) customer sales and transfers. Trade receivables reported by the smelter as due from affiliated customers should be stated or, if necessary, restated on credit terms equivalent to those received by unaffiliated customers on a sale of comparable products. Attach as part of Exhibit B a schedule showing adjustments in the smelter's receivables investments required to equate trade credit terms extended to affiliated and unaffiliated customers.

*Lines 05 and 06—Inventory Investments.* Report for each year respective end-of-period investments in raw material, work-in-process and finished good inventories held to support the smelter's production and sale of products (Line 05) and associated inventories of other materials and supplies (Line 06). These inventories must be valued at current market prices. Inventory purchases from affiliated suppliers should also be stated at current market prices or, if necessary, restated at current market prices prevailing on purchases from unaffiliated suppliers. Attach explanatory supporting schedules as part of Exhibit B.

*Line 07—Other Current Assets.* Report for each year prepaid expenses, deferred charges, non-trade notes and accounts receivable, and other assets classified as current for certified financial statement reporting purposes that are assignable to the smelter's operations. Attach as part of Exhibit B a schedule classifying these other current assets according to their types and amounts.

*Line 08—Total Current Assets.* Enter for each year the total of Lines 01 through 07.

*Lines 09 to 14—Property, Plant and Equipment.* Report for each year by individual line item property, plant and equipment investments assignable to smelter operations. Include in gross facility investments at the end of each period both (1) property, plant and equipment directly associated with the smelter's operations and (2) facilities shared with other operating segments to the extent that a causal and beneficial relationship can be established for the inter-segment allocation of such facility investments.

Attach as part of Exhibit B a schedule reporting by individual line item the annual capital expenditures on additional property, plant and equipment investments in the smelter's operations. Further classify these annual capital expenditures into both (1) investments required to maintain the smelter versus investments in smelter expansion and improvement and (2) direct facility versus joint-use facility investments. Explain the method used for allocating capital expenditures on joint-use facilities to the smelter's operations. Refer to Line 17 instructions for additional reporting requirements on the smelter's facility investments.

*Line 15—Total Smelter Investment.* Enter for each year the total of Lines 09 through 14.

*Line 16—Accumulated Depreciation and Amortization.* Report for each year accumulated depreciation, amortization and other valuation charges recorded for certified financial statement reporting purposes in relation to smelter investment as reported on Line 15. Other valuation charges are defined in Financial Accounting Standards Board (FASB) Statement No. 19 as losses recognized in connection with an impairment in the value of an unimproved property below its acquisition cost. Refer to Line 17 instructions for additional reporting requirements on smelter facility investments.

*Line 17—Net Smelter Investment.* Enter for each year the difference between Lines 15 and 16. Attach as part of Exhibit B a schedule classifying gross facility investments, accumulated depreciation, amortization charges, and net facility investments by major pollution control and non-pollution

control components. Identify for each asset component the direct versus joint-use investments assigned to the smelter and explain the basis used to allocate amounts associated with joint-use facilities to the smelter.

*Line 18—Other Non-Current Assets.* Report for each year other assets assignable to the smelter's operations. Attach as part of Exhibit B a schedule reporting by type and amount the major components of such investments.

*Line 19—Total Smelter Capital Investment.* Enter for each year the total of Lines 08, 17 and 18.

*Line 20 and 21—Trade Accounts and Notes Payable.* Report for each year trade accounts and notes due on the smelter's purchases from unaffiliated suppliers (Line 20) and on its intersegment transfers or purchases from affiliated suppliers (Line 21). Trade payables reported by the smelter as due to affiliated suppliers should be stated or, if necessary, restated on terms equivalent to those received from unaffiliated suppliers on a purchase of comparable materials. Attach as part of Exhibit B a schedule showing adjustments required on the smelter's trade payables to equate trade credit terms received from affiliated and unaffiliated suppliers.

*Line 22—Other Expense Accruals.* Report for each year payments classified as current for salaries and wages, other employee benefits, operating taxes and related operating expenses assignable to the smelter's operations. Attach as part of Exhibit B a schedule classifying by type and amount the major components of such accruals.

*Line 23—Current Notes Payable.* Report for each year payments due to nontrade creditors on short-term financing arrangements directly associated with the smelter's operations. Exclude current installments due on long-term debt financing arrangements, notes due to offices and directors, intersegment loans or advances and loans or advances from affiliated operating segments.

*Line 24—Other Current Liabilities.* Report for each year other nontrade payables classified as current obligations assignable to the smelter's operations.

*Line 25—Total Current Liabilities.* Enter for each year the total of Lines 20 through 24.

*Line 26—Net Smelter Capital Investment.* Enter for each year the difference between Lines 19 and 25.

Schedule B.1—Pre-Control Revenue Forecast

General. Use Schedule B.1 to report annual forecasts of operating revenues anticipated during the years 1984 through 1990 from operation of the smelter subject to this NSO application. These pre-control revenue projections should be based on revenues and production associated with operating the smelter without any $SO_2$ air pollution controls that have not been installed as of the NSO application date. Forecast smelter revenues should be expressed on a tolling service equivalent basis as described in Section 2.3.4.

Copper smelters that will process concentrates containing an average of 1,000 pounds per hour or more of arsenic during the forecast period should assume that they will use best engineering techniques to control fugitive emissions of arsenic. All smelters should also assume that they will be required to meet all other regulatory requirements in effect at the time the application is made.

The line items in Schedule B.1 are explained in the following instructions. Attach as part of Exhibit B schedules to (1) explain the methods used to make the required forecasts, (2) explain differences, if any, between historical trends and the forecasts and (3) provide data and information to support the forecasts.

*Lines 01 and 05—Concentrates Processed.* Report for each year the forecast quantity of concentrates processed for unaffiliated parties (Line 01) and affiliated parties (Line 05).

*Lines 02 and 06—Smelting Charge.* Report for each year the forecast smelting charge for unaffiliated parties (Line 02) and affiliated parties (Line 06). See Section 2.4 for forecast copper smelting charges furnished by EPA.

*Lines 03 and 07—Total Smelter Revenues.* Report for each year the forecast total operating revenues derived from processing concentrates. The total for unaffiliated parties (Line 03) is equal to the product of Lines 01, 02, and 04, and for affiliated parties (Line 07), the product of Lines 05, 06, and 08.

*Lines 04 and 08—Average Product Grade.* Report for each year the forecast average quality rating assigned to concentrates processed for unaffiliated parties (Line 04) and affiliated parties (Line 08).

*Line 09—Total Co-Product Revenues.* Report for each year the forecast net revenues from sales of co-products derived from the smelter's operations. Attach as part of Exhibit B a schedule showing by individual type of co-product, the forecast quantity produced and sold, forecast market price per unit of sales, and forecast total revenues derived from the co-product sales.

*Line 10—Total By-product Revenues From Pollution Control Facilities.* Report for each year forecast revenues from the sale of by-products derived from operation of the smelter's pollution control facilities, excluding any $SO_2$ air pollution controls that have not been installed as of the NSO application date. Attach as part of Exhibit B a schedule showing by type of by-product produced (e.g., sulfuric acid) the forecast quantity of output, forecast market price per unit of output sold, and forecast total revenue derived from the by-product sales.

*Line 11—Total By-product Revenues From Other Smelter Processing.* Report forecast revenues from the sales of gold, silver, and

other by-products derived from the smelter's operations. Attach as part of Exhibit B a schedule providing additional documentation as specified in the instructions for Line 10.

*Line 12—Total Co-product and By-product Revenues.* Enter for each year the total of Lines 09 through 11.

Schedule B.2—Pre-Control Cost Forecast

*General.* Use Schedule B.2 to report annual forecasts of operating costs anticipated during the years 1984 through 1990 from operation of the smelter subject to this NSO application. These pre-control cost projections should be based on costs and production associated with operating the smelter without any $SO_2$ air pollution controls that have not been installed as of the NSO application date.

Copper smelters that will process concentrates containing an average of 1,000 pounds per hour or more of arsenic during the forecast period should assume that they will use best engineering techniques to control fugitive emissions of arsenic. All smelters should also assume that they will be required to meet all other regulatory requirements in effect at the time the application is made.

The line items in Schedule B.2 are explained in the following instructions. Attach as part of Exhibit B schedules to (1) explain the methods used to make the required forecasts, (2) explain differences, if any, between historical trends and the forecasts, and (3) provide data and information to support the forecasts.

*Line 01—Direct Labor Hours.* Report for each year the quantity of direct labor hours required to support the processing levels previously reported. Attach as part of Exhibit B an explanation of the labor productivity factors involved.

*Line 02—Average Hourly Wage Rate.* Report for each year the forecast average wage rate per unit of direct labor input. Attach as part of Exhibit B a description of direct labor cost factors under any existing labor contracts that extend to the forecast period and an explanation of the methodology used to forecast wage rates. EPA-provided forecast wage indices are reported in Section 2.4.

*Line 03—Total Wage Payments.* Enter for each year the product of Lines 01 and 02.

*Line 04—Supplemental Employee Benefits.* Report for each year adjustments required to direct labor costs for other employee compensation under supplemental benefit plans. Attach as part of Exhibit B a description of such plans and their costs and an explanation of the methodology used to forecast such costs. EPA-provided forecast wage indices are reported in Section 2.4.

*Line 05—Total Production Labor Cost.* Enter for each year the total of Lines 03 and 04.

*Lines 06, 09, 12, 15 and 18—Energy Quantities.* Report for each year the quantity of energy by type required to support the processing levels reported in the smelter's revenue. Attach as part of Exhibit B an explanation of energy characteristics and use factors considered in forecasting the smelter's future energy requirements.

*Lines 07, 10, 13, 16, and 19—Unit Prices.* Report for each year the forecast price per unit of energy input by type of energy. Attach as part of Exhibit B a description of the energy price factors under any existing energy contracts that extend to the forecast period and an explanation of the methodology used to forecast unit energy prices. EPA-provided forecast energy indices are reported in Section 2.4.

*Lines 08, 11, 14, 17, and 20—Total Payments.* Enter for each year the products of quantity and prices paid for electricity (Lines 06×07), natural gas (Lines 09×10), coal (Lines 12×13), fuel oil (Lines 15×16), and other (Lines 18×19).

*Line 21—Total Energy Costs.* Enter for each year the total of Lines 08, 11, 14, 17, and 20.

Schedule B.3—Pre-Control Forecast Profit and Loss Summary

*General.* Use Schedule B.3 to report annual forecasts of operating revenues and operating costs derived in Schedules B.1 and B.2 for the years 1984 through 1990. The transfer of line items from Schedules B.1 and B.2 to this Schedule is explained in the following instructions.

*Line 01—Smelter Revenues-Unaffiliated Parties.* Enter the totals reported in Schedule B.1, Line 03.

*Line 02—Smelter Revenues-Affiliated Parties.* Enter the totals reported in Schedule B.1, Line 07.

*Line 03—Co-product and By-product Sales Revenues.* Enter the totals reported in Schedule B.1, Line 12.

*Line 04—Other Operating Revenues.* Report operating revenues anticipated from sources not accounted for under Lines 01 through 03. Refer to instructions for Line 04 of Schedule A.3 for items that should not be included in ''Other Operating Revenues.'' Attach as part of Exhibit B a schedule showing annual amounts forecast by individual revenue component for ''other'' operating revenues associated with the smelter's forecast pre-control operations. Identify in the supporting schedule any differences in the ''other'' revenue components reported in this Schedule and Schedule A.3 and explain the reasons for such differences.

*Line 05—Total Operating Revenues.* Enter for each year the total of Lines 01 through 04.

*Line 06—Material Costs.* Report total costs forecast for flux, refractories, coke and other materials directly associated with the smelter's processing of concentrates. Attach as part of Exhibit B a schedule showing the annual amounts forecast by major material cost components. For each cost component, identify the forecast quantity and unit price

elements of material cost and explain the basis for forecasting these quantity and price elements. Identify in the supporting schedule any differences in the ''other'' material cost components shown in this Schedule and Schedule A.3 and explain the reasons for such differences.

*Line 07—Production Labor Costs.* Enter the totals reported in Schedule B.2, Line 05.

*Line 08—Energy Costs.* Enter the totals reported in Schedule B.2, Line 21.

*Line 09—Pollution Control Costs.* Report the total costs forecast for expenses identifiable with operation and maintenance of all pollution control equipment and facilities except any SO2 air pollution controls that have not been installed as of the NSO application date. By-product credits associated with operation of the pollution control facilities should be eliminated from the cost accounts, reclassified to Schedule B.1, Line 10 and included in Line 03 of this Schedule. Attach a schedule as part of Exhibit B classifying pollution control costs by major cost components. Explain the basis used for estimating each of the cost components.

*Line 10—Production Overhead Costs.* Report the total costs forecast for indirect labor, indirect materials and other production overhead costs associated with the smelter's operations. Attach as part of Exhibit B a schedule showing annual overhead costs projected by major cost components associated with the smelter's operations. For each cost component, where appropriate, identify the forecast quantity and unit price elements of overhead costs and explain the basis for estimating these quantity and price elements. Also identify in the supporting schedule any differences in production overhead cost classifications used in this Schedule and Schedule A.3 and explain the reasons for such differences.

*Line 11—Other Production Costs.* Report other forecast production costs not previously reported on Lines 06 through 10. Attach as part of Exhibit B supporting schedules showing the basis of the forecasts.

*Line 12—Total Cost of Sales.* Enter for each year the sum of operating costs reported on Lines 06 through 11.

*Line 13—Gross Operating Profit.* Enter for each year the difference between Lines 05 and 12.

*Line 14—Selling, General and Administrative Expenses.* Report the total costs forecast for administrative, marketing and general corporate overhead functions that directly or indirectly support the smelter's operations. Refer to the NSO Financial Reporting Overview for a general discussion of indirect cost allocations from overhead cost pools. Attach as part of Exhibit B a schedule classifying selling, general and administrative expenses into major cost components. Indicate whether each component represents costs directly assignable to the smelter or indirect costs allocated from other business segments to the smelter. Explain the basis used for estimating the amount of expected costs included in each component and the basis used for allocating indirect cost elements to the smelter. Identify and explain any differences between the selling, general and administrative cost classification used in this Schedule and that used in Line 15 of Schedule A.3.

*Line 15—Taxes, Other than Income Taxes.* Report the total costs forecast for property taxes and associated levies paid to governmental units by or for the benefits of the smelter operation. Attach as part of Exhibit B a schedule classifying operating taxes by major component. Indicate whether each component represents taxes directly assignable to the smelter or taxes that have been allocated among more than one facility. Explain the basis used for estimating taxes and the basis for any allocation of taxes to the smelter. Identify and explain any differences between the component classifications used in this Schedule and those used in Line 16 of Schedule A.3.

*Line 16—Research Costs.* Report the estimates of research costs incurred directly by or for the benefit of the smelter operations. Attach as part of Exhibit B a schedule classifying the costs by major direct and indirect assigned components. Explain the basis for estimating the costs assigned to each component. Identify and explain any differences between classifications used in this Schedule and those used in Line 17 of Schedule A.3.

*Line 17—Pollution Control Facility Depreciation and Amortization.* Report the estimates of depreciation and amortization charges associated with the smelter's actual and forecast investment in all pollution control equipment and facilities except any $SO_2$ air pollution controls that have not been installed as of the NSO application date. Reported charges should be computed in accordance with depreciation and amortization methods adopted for certified financial statement reporting purposes by the firm. Attach explanatory supporting schedules as part of Exhibit B.

*Line 18—Other Smelter Facility Depreciation and Amortization.* Report the pro forma estimates of depreciation and amortization charges associated with the smelter's investment in equipment and facilities other than those classified as pollution control facilities. Attach explanatory supporting schedules as part of Exhibit B.

*Line 19—Interests.* Report the estimates of interest and other financing charges on the smelter's current and long-term liabilities. Attach as part of Exhibit B a schedule showing the interest-bearing debt contracts identifiable with the smelter's operations, the interest rate projected for these contracts, and the estimated annual interest charges.

*Line 20—Miscellaneous Operating Expenses.* Report only the total operating expenses associated with or allocated to the smelter that cannot be appropriately classified in one of the preceding line items. Attach as part of Exhibit B a schedule showing the classification of these residual operating expenses into major cost components. Explain the basis used for forecasting the cost under each component. Identify each cost component in terms of direct or indirect cost and explain the basis used for allocating the indirect costs to smelter operations. Identify and explain any differences between cost classifications included in this Schedule and those used in Line 21 of Schedule A.3.

*Line 21—Total Other Operating Expenses.* Enter for each year the sum of operating costs reported on Lines 14 through 20.

*Line 22—Income From Operations.* Enter for each year the difference between Lines 21 and 13.

Schedule B.4—Constant Controls Revenue Forecast

*General.* Use Schedule B.4 to report annual forecasts of operating revenues anticipated during the years 1984 through 1990 from operation of the smelter subject to this NSO application. These constant controls revenue forecasts should be based on an assumption that the applicant immediately implements a program of additional pollution control facility investments sufficient to achieve full compliance with the smelter's SIP stack emission limitations for sulfur dioxide. Forecast smelter revenues should be expressed on a tolling service equivalent basis as described in Section 2.3.4.

The assumed investment program should be based on whichever adequately demonstrated system, applicable to the smelter, that would be most economically beneficial subsequent to installation of the system. For this purpose, adequately demonstrated systems include those specified in Section 57.102(b)(1).

Copper smelters that will process concentrates containing an average of 1,000 pounds per hour or more of arsenic during the forecast period should assume that they will use best engineering techniques to control fugitive emissions of arsenic. All smelters should also assume that they will be required to meet all other regulatory requirements in effect at the time the application is made.

The line items in Schedule B.4 are explained in the following instructions. Attach as part of Exhibit B schedules to (1) explain the methods used to make the required forecasts, (2) explain differences, if any, between historical trends and the forecasts, and (3) provide data and information to support the forecasts.

*Lines 01 and 05—Concentrates Processed.* Report for each year the forecast quantity of concentrates processed for unaffiliated parties (Line 01) and affiliated parties (Line 05).

*Lines 02 and 06—Smelting Charge.* Report for each year the forecast smelting charge for unaffiliated parties (Line 02) and affiliated parties (Line 06). See Section 2.4 for forecast copper smelting charges furnished by EPA.

*Lines 03 and 07—Total Smelter Revenues.* Report for each year the forecast total operating revenues derived from processing concentrates. The total for unaffiliated parties (Line 03) is equal to the product of Lines 01, 02, and 04, and for affiliated parties (Line 07), the product of Lines 05, 06, and 08.

*Lines 04 and 08—Average Product Grade.* Report for each year the forecast average quality rating assigned to concentrates processed for unaffiliated parties (Line 04) and affiliated parties (Line 08).

*Line 09—Total Co-Product Revenues.* Report for each year the forecast net revenues from sales of co-products derived from the smelter's operations. Attach as part of Exhibit B a schedule showing by individual type of co-product, the forecast quantity produced and sold, forecast market price per unit of sales, and forecast total revenues derived from the co-product sales.

*Line 10—Total By-product Revenues From Pollution Control Facilities.* Report for each year forecast revenues from the sale of by-products derived from operation of the smelter's pollution control facilities. Attach as part of Exhibit B a schedule showing by type of by-product produced (e.g., sulfuric acid) the forecast quantity of output, forecast market price per unit of output sold, and forecast total revenue derived from the by-product sales.

*Line 11—Total By-product Revenues From Other Smelter Processing.* Report forecast revenues from the sales of gold, silver, and other by-products derived from the smelter's operations. Attach as part of Exhibit B a schedule providing additional documentation as specified in the instructions for Line 10.

*Line 12—Total Co-product and By-product Revenues.* Enter for each year the total of Lines 09 through 11.

Schedule B.5—Constant Controls Cost Forecast

*General.* Use Schedule B.5 to report annual forecasts of operating costs anticipated during the years 1984 through 1990 from operation of the smelter subject to this NSO application. These constant controls cost forecasts should be based on an assumption that the applicant immediately implements a program of additional pollution control facility investments sufficient to achieve full compliance with the smelter's SIP stack emission limitations for sulfur dioxide.

The assumed investment program should be based on whichever adequately demonstrated system, applicable to the smelter,

would be most economically beneficial subsequent to installation of the system. For this purpose, adequately demonstrated systems include those specified in § 57.102(b)(1).

Copper smelters that will process concentrates containing an average of 1,000 pounds per hour or more of arsenic during the forecast period should assume that they will use best engineering techniques to control fugitive emissions of arsenic. All smelters should also assume that they will be required to meet all other regulatory requirements in effect at the time the application is made.

The line items in Schedule B.5 are explained in the following instructions. Attach as part of Exhibit B schedules to (1) explain the methods used to make the required forecasts, (2) explain differences, if any, between historical trends and the forecasts, and (3) provide data and information to support the forecasts.

*Line 01—Direct Labor Hours.* Report for each year the quantity of direct labor hours required to support the processing levels previously reported. Attach as part of Exhibit B an explanation of the labor productivity factors involved.

*Line 02—Average Hourly Wage Rate.* Report for each year the forecast average wage rate per unit of direct labor input. Attach as part of Exhibit B a description of direct labor cost factors under any existing labor contracts that extend to the forecast period and an explanation of the methodology used to forecast wage rates. EPA-provided forecast wage indices are reported in Section 2.4.

*Line 03—Total Wage Payments.* Enter for each year the product of Lines 01 and 02.

*Line 04—Supplemental Employee Benefits.* Report for each year adjustments required to direct labor costs for other employee compensation under supplemental benefit plans. Attach as part of Exhibits B a description of such plans and their costs and an explanation of the methodology used to forecast such costs. EPA-provided forecast wage indices are reported in Section 2.4.

*Lines 05—Total Production Labor Cost.* Enter for each year the total of Lines 03 and 04.

*Lines 06, 09, 12, 15 and 18—Energy Quantities.* Report for each year the quantity of energy by type required to support the processing levels reported in the smelter's revenue. Attach as part of Exhibit B an explanation of energy characteristics and use factors considered in forecasting the smelter's future energy requirements.

*Lines 07, 10, 13, 16, and 19—Unit Prices.* Report for each year the forecast price per unit of energy input by type of energy. Attach as part of Exhibit B a description of the energy price factors under any existing energy contracts that extend to the forecast period and an explanation of the methodology used to forecast unit energy prices. EPA-provided forecast energy indices are reported in Section 2.4.

*Lines 08, 11, 14, 17, and 20—Total Payments.* Enter for each year the products of quantity and prices paid for electricity (Lines 06×07), natural gas (Lines 09×10), coal (Lines 12×13), fuel oil (Lines 15×16), and other (Lines 18×19).

*Lines 21—Total Energy Costs.* Enter for each year the total of Lines 08, 11, 14, 17, and 20.

Schedule B.6—Constant Controls Forecast Profit and Loss Summary for the Profit Protection Test

*General.* Use Schedule B.6 to report annual forecasts of operating revenues and operating costs derived in Schedules B.4 and B.5 for the years 1984 through 1990. These constant controls forecasts should be based on an assumption that the applicant immediately implements a program of additional pollution control facility investments sufficient to achieve full compliance with the smelter's SIP stack emission limitations for sulfur dioxide. The transfer of line items from Schedules B.4 and B.5 to this Schedule is explained in the following instructions.

*Line 01—Smelter Revenues-Unaffiliated Parties.* Enter the totals reported in Schedule B.4, Line 03.

*Line 02—Smelter Revenues-Affiliated Parties.* Enter the totals reported in Schedule B.4, Line 07.

*Line 03—Co-product and By-product Sales Revenues.* Enter the totals reported in Schedule B.4, Line 12.

*Line 04—Other Operating Revenues.* Report operating revenues anticipated from sources not accounted for under Lines 01 through 03. Refer to instructions for Line 04 of Schedule A.3 for items that should not be included in ''Other Operating Revenues.'' Attach as part of Exhibit B a schedule showing annual amounts forecast by individual revenue component for ''other'' operating revenues associated with the smelter's forecast constant controls operations. Identify in the supporting schedule any differences in the ''other'' revenue components reported in this Schedule and Schedule A.3 and explain the reasons for such differences.

*Line 05—Total Operating Revenues.* Enter for each year the total of Lines 01 through 04.

*Line 06—Material Costs.* Report total costs forecast for flux, refractories, coke and other materials directly associated with the smelter's processing of concentrates. Attach as part of Exhibit B a schedule showing the annual amounts forecast by major material cost components. For each cost component, identify the forecast quantity and unit price elements of material cost and explain the basis for forecasting these quantity and price elements. Identify in the supporting schedule any differences in the ''other'' material cost components shown in this Schedule and Schedule A.3 and explain the reasons for such differences.

*Line 07—Production Labor Costs*. Enter the totals reported in Schedule B.5, Line 05.

*Line 08—Energy Costs*. Enter the totals reported in Schedule B.5, Line 21.

*Line 09—Pollution Control Costs*. Report the total costs forecast for expenses identifiable with operation and maintenance of all pollution control equipment and facilities. By-product credits associated with operation of the pollution control facilities should be eliminated from the cost accounts, reclassified to Schedule B.4, Line 10 and included in Line 03 of this Schedule. Attach a schedule as part of Exhibit B classifying pollution control costs by major cost components. Explain the basis used for estimating each of the cost components.

*Line 10—Production Overhead Costs*. Report the total costs forecast for indirect labor, indirect materials and other production overhead costs associated with the smelter's constant controls forecasts. Attach as part of Exhibit B a schedule showing annual overhead costs projected by major cost components associated with the smelter's operations. For each cost component, where appropriate, identify the forecast quantity and unit price elements of overhead costs and explain the basis for estimating these quantity and price elements. Also identify in the supporting schedule any differences in production overhead cost classifications used in this Schedule and Schedule A.3 and explain the reasons for such differences.

*Line 11—Other Production Costs*. Report other forecast production costs not previously reported on Lines 06 through 10. Attach as part of Exhibit B supporting schedules showing the basis of the forecasts.

*Line 12—Total Cost of Sales*. Enter for each year the sum of operating costs reported on Lines 06 through 11.

*Line 13—Gross Operating Profit*. Enter for each year the difference between Lines 05 and 12.

*Line 14—Selling, General and Administrative Expenses*. Report the total costs forecast for administrative, marketing and general corporate overhead functions that directly or indirectly support the smelter's operations. Refer to the NSO financial Reporting Overview for a general discussion of indirect cost allocations from overhead cost pools. Attach as part of Exhibit B a schedule classifying selling, general and administrative expenses into major cost components. Indicate whether each component represents costs directly assignable to the smelter or indirect costs allocated from other business segments to the smelter. Explain the basis used for estimating the amount of expected costs included in each component and the basis used for allocating indirect cost elements to the smelter. Identify and explain any differences between the selling, general and administrative cost classification used in this Schedule and that used in Line 15 of Schedule A.3.

*Line 15—Taxes, Other than Income Taxes*. Report the total costs forecast for property taxes and associated levies paid to governmental units by or for the benefit of the smelter operation. Attach as part of Exhibit B a schedule classifying operating taxes by major component. Indicate whether each component represents taxes directly assignable to the smelter or taxes that have been allocated among more than one facility. Explain the basis used for estimating taxes and the basis for any allocation of taxes to the smelter. Identify and explain any differences between the component classifications used in this Schedule and those used in Line 16 of Schedule A.3.

*Line 16—Research Costs*. Report the estimates of research costs incurred directly by or for the benefit of the smelter operations. Attach as part of Exhibit B a schedule classifying the costs by major direct and indirect cost components. Explain the basis for estimating the costs assigned to each component. Identify and explain any differences between classifications used in this Schedule and those used in Line 17 of Schedule A.3.

*Line 17—Pollution Control Facility Depreciation and Amortization*. Report the estimates of depreciation and amortization charges associated with the smelter's actual and forecast investment in all pollution control equipment and facilities. Reported charges should be completed in accordance with depreciation and amortization methods adopted for certified financial statement reporting purposes by the firm. Attach explanatory supporting schedules as part of Exhibit B.

*Line 18—Other Smelter Facility Depreciation and Amortization*. Report the pro forma estimates of depreciation and amortization charges associated with the smelter's investment in equipment and facilities other than those classified as pollution control facilities. Attach explanatory supporting schedules as part of Exhibit B.

*Line 19—Interest*. Report the estimates of interest and other financing charges on the smelter's current and long-term liabilities. Attach as part of Exhibit B a schedule showing the interest-bearing debt contracts identifiable with the smelter's operations, the interest rate projected for these contracts, and the estimated annual interest charges.

*Line 20—Miscellaneous Operating Expenses*. Report only the total operating expenses associated with or allocated to the smelter that cannot be appropriately classified in one of the preceding line items. Attach as part of Exhibit B a schedule showing the classification of these residual operating expenses into major cost components. Explain the basis used for forecasting the cost under each component. Identify each cost component in terms of direct or indirect cost and explain the basis used for allocating the indirect costs to smelter operations. Identify and

explain any differences between cost classifications included in this Schedule and those used in Line 21 of Schedule A.3.

*Line 21—Total Other Operating Expenses.* Enter for each year the sum of operating costs reported on Lines 14 through 20.

*Line 22—Income From Operations.* Enter for each year the difference between Lines 21 and 13.

Schedule B.7—Profit Protection Test

*General.* Applicants must complete this Schedule and/or Schedule C.4 and the accompanying schedules if they seek eligibility for an NSO. The line items in Schedule B.7 are explained in the following instructions.

*Line 01—Net Income from Operations.* Enter for each year the amounts reported in Schedule B.3, Line 22.

*Line 02—Discount Factors.* Enter the discount factor for each year, computed as described in the instructions under Section 2.6.

*Line 03—Present Value of Future Net Income.* Enter for each year the product of Lines 01 and 02.

*Line 04—Horizon Value.* Enter under the Total column, the estimated horizon value of the smelter. This shall be computed by capitalizing the forecast net income from operations in Line 01 as described in the instructions under Section 2.7.

*Line 05—Discount Factor.* Enter under the Total column the appropriate discount factor corresponding to the weighted cost of capital, computed as described in the instructions under Section 2.6.

*Line 06—Present Value of Horizon Value.* Enter under the Total column the product of Lines 04 and 05.

*Line 07—Present Value of Future Net Income.* Enter under the Total Column the sum of amounts previously reported on Line 03 for 1984 through 1990.

*Line 08—Total Present Value.* Enter for each year the sum of Lines 06 and 07.

*Line 09—Net Income from Operations.* Enter for each year the amount reported in Schedule B.6, Line 22.

*Line 10—Discount Factors.* Follow the instructions for Line 02.

*Line 11—Present Value of Future Net Income.* Enter for each year the product of Lines 09 and 10.

*Line 12—Horizon Value.* Enter under the Total column, the estimated horizon value of the smelter. This shall be computed by capitalizing the forecast net income from operations in Line 09 as described in the instructions under Section 2.7.

*Line 13—Discount Factor.* Follow the instructions for Line 05.

*Line 14—Present Value of Horizon Value.* Enter under the Total column the product of Lines 12 and 13.

*Line 15—Present Value of Future Net Income.* Enter under the Total column the sum of amounts previously reported on Line 11 for 1984 through 1990.

*Line 16—Total Present Value.* Enter the sum of Lines 14 and 15.

*Line 17—Ratio for Total Present Value of Constant Controls Case to Total Present Value of Pre-Control Case.* Enter the ratio of Lines 16 to 08. If this ratio is less than .50, the smelter passes the Profit Protection Test. An applicant also passes the Profit Protection Test if the reported total present value of pre-tax profits for the pre-control case on Line 08 is a negative value.

Schedule C.1—Constant Controls Forecast Profit and Loss Summary for the Rate of Return Test

*General.* Use Schedule C.1 to report forecast revenue and cost information derived in Schedules B.4 and B.5 for the years 1984 through 1990. These constant controls forecasts should be based on an assumption that the applicant immediately implements a program of additional pollution control facility investments sufficient to achieve full compliance with the smelter's SIP stack emission limitations for sulfur dioxide. The transfer of line items from Schedules B.4 and B.5 to this Schedule is explained in the following instructions.

*Line 01—Smelter Revenues-Unaffiliated Parties.* Enter the totals reported in Schedule B.4, Line 03.

*Line 02—Smelter Revenues-Affiliated Parties.* Enter the totals reported in Schedule B.4, Line 07.

*Line 03—Co-product and By-product Sales Revenues.* Enter the totals reported in Schedule B.4, Line 12.

*Line 04—Other Operating Revenues.* Report operating revenues anticipated from sources not accounted for under Lines 01 through 03. Refer to instructions for Line 04 of Schedule A.3 for items that should not be included in ''Other Operating Revenues.'' Attach as part of Exhibit B a schedule showing annual amounts forecast by individual revenue component for ''other'' operating revenues associated with the smelter's forecast constant controls operations. Identify in the supporting schedule any differences in the ''other'' revenue components reported in this Schedule and Schedule A.3 and explain the reasons for such differences.

*Line 05—Total Operating Revenues.* Enter for each year the total of Lines 01 through 04.

*Line 06—Material Costs.* Report total costs forecast for flux, refractories, coke and other materials directly associated with the smelter's processing of concentrates. Attach as part of Exhibit B a schedule showing the annual amounts forecast by major material cost components. For each cost component, identify the forecast quantity and unit price elements of material cost and explain the basis for forecasting these quantity and price elements. Identify in the supporting schedule

any differences in the ''other'' material cost components shown in this Schedule and Schedule A.3 and explain the reasons for such differences.

*Line 07—Production Labor Costs.* Enter the totals reported in Schedule B.5, Line 05.

*Line 08—Energy Costs.* Enter the totals reported in Schedule B.5, Line 21.

*Line 09—Pollution Control Costs.* Report the total costs forecast for expenses identifiable with operation and maintenance of all pollution control equipment and facilities. By-product credits associated with operation of the pollution control facilities should be eliminated from the cost accounts, reclassified to Schedule B.4, Line 10 and included in Line 03 of this Schedule. Attach a schedule as part of Exhibit B classifying pollution control costs by major cost components. Explain the basis used for estimating each of the cost components.

*Line 10—Production Overhead Costs.* Report the total costs forecast for indirect labor, indirect materials and other production overhead costs associated with the smelter's constant controls forecasts. Attach as part of Exhibit B a schedule showing annual overhead costs projected by major cost components associated with the smelter's operations. For each cost component, where appropriate, identify the forecast quantity and unit price elements of overhead costs and explain the basis for estimating these quantity and price elements. Also identify in the supporting schedule any differences in production overhead cost classifications used in this Schedule and Schedule A.3 and explain the reasons for such differences.

*Line 11—Other Production Costs.* Report other forecast production costs not previously reported on Lines 06 through 10. Attach as part of Exhibit B supporting schedules showing the basis of the forecasts.

*Line 12—Total Cost of Sales.* Enter for each year the sum of operating costs reported on Lines 06 through 10.

*Line 13—Gross Operating Profit.* Enter for each year the difference between Lines 05 and 12.

*Line 14—Selling, General and Administrative Expenses.* Report the total costs forecast for administrative, marketing and general corporate overhead functions that directly or indirectly support the smelter's operations. Refer to the NSO Financial Reporting Overview for a general discussion of indirect cost allocations from overhead cost pools. Attach as part of Exhibit B a schedule classifying selling, general and administrative expenses into major cost components. Indicate whether each component represents costs directly assignable to the smelter or indirect costs allocated from other business segments to the smelter. Explain the basis used for estimating the amount of expected costs included in each component and the basis used for allocating indirect cost elements to the smelter. Identify and explain any differences between the selling, general and administrative cost classification used in this Schedule and that used in Line 15 of Schedule A.3.

*Line 15—Taxes, Other than Income Taxes.* Report the total costs forecast for property taxes and associated levies paid to governmental units by or for the benefit of the smelter operation. Attach as part of Exhibit B a schedule classifying operating taxes by major component. Indicate whether each component represents taxes directly assignable to the smelter or taxes that have been allocated among more than one facility. Explain the basis used for estimating taxes and the basis for any allocation of taxes to the smelter. Identify and explain any differences between the component classifications used in this Schedule and those used in Line 16 of Schedule A.3.

*Line 16—Research Costs.* Report the estimates of research costs incurred directly by or for the benefit of the smelter operations. Attach as part of Exhibit B a schedule classifying the costs by major direct and indirect costs components. Explain the basis for estimating the costs assigned to each component. Identify and explain any differences between classifications used in this Schedule and those used in Line 17 of Schedule A.3.

*Line 17—Pollution Control Facility Depreciation and Amortization.* Report the estimates of depreciation and amortization charges associated with the smelter's actual and forecast investment in all pollution control equipment and facilities. Reported charges should be computed in accordance with depreciation and amortization methods adopted for tax reporting purposes by the firm. Attach explanatory supporting schedules as part of Exhibit B.

*Line 18—Other Smelter Facility Depreciation and Amortization.* Report the pro forma estimates of depreciation and amortization charge associated with the smelter's investment in equipment and facilities other than those classified as pollution control facilities. Attach explanatory supporting schedules as part of Exhibit B.

*Line 19—Interest on Short-Term Debt.* Report the estimates of interest and other financing charges on forecast short-term obligations as classified in the smelter's current liabilities on Schedule A.4. Interest and associated financing charges on long-term debt should not be included as an expense identifiable with the smelter's operations. Attach as part of Exhibit B a schedule showing the interest-bearing, short-term debt contracts identifiable with the smelter's operations, the interest rate projected for these contracts, and the estimated annual interest charges. Identify and explain any differences between the classifications used in this Schedule and those used in Line 20 of Schedule A.3.

*Line 20—Miscellaneous Operating Expenses.* Report only the total operating expenses associated with or allocated to the smelter that cannot be appropriately classified in one of the preceding line items. Attach as part of Exhibit B a schedule showing the classification of these residual operating expenses into major cost components. Explain the basis used for forecasting the cost under each component. Identify each cost component in terms of direct or indirect cost and explain the basis used for allocating the indirect costs to smelter operations. Identify and explain any differences between cost classification included in this Schedule and those used in Line 21 of Schedule A.3.

*Line 21—Total Other Operating Expenses.* Enter for each year the sum of operating costs reported on Lines 14 through 20.

*Line 22—Income From Operations.* Enter for each year the difference between Lines 21 and 13.

*Line 23—Income Taxes.* Enter the product of income from operations (Line 22) and the sum of the Federal, State and local marginal tax rates. Attach as part of Exhibit B a schedule detailing the estimated marginal tax rate by taxing entity.

*Line 24—Net Income From Operations.* Enter for each year the difference between Lines 23 and 22.

Schedule C.2—Constant Controls Sustaining Capital Investment Forecast

*General.* The applicant should estimate and report, in Schedule C.2, yearly sustaining capital outlays for maintenance of the smelter's existing productive capability. These estimates should be forecast under the assumption that full compliance with SIP emission limitations for $SO_2$ will be achieved. Major elements of these outlays should be disclosed, as well as the total of such outlays. Estimates shall be restricted to those items that will be capitalized for tax purposes. These outlays shall primarily be for plant replacement, although outlays for improvements and expansion may be included to the extent that improvements and/or expansion, exclusive of required pollution control outlays, can be justified as economically feasible. Estimates of sustaining capital shall exclude any incremental investment for constant control requirements. Sustaining capital investments in facilities shared with other operating segments shall be allocated in accordance with the instructions given below.

Estimates of sustaining capital shall be compatible with productive capacity and pollution control requirements underlying the operating revenue and cost forecasts incorporated in Schedule C.1.

*Lines 01 to 06—Sustaining Capital.* Report for each year by individual line item property, plant and equipment sustaining capital investments assignable to smelter operations. Include both (1) property, plant and equipment directly associated with the smelter's operations and (2) facilities shared with other operating segments to the extent that a causal and beneficial relationship can be established for the intersegment allocations of such facility investments.

Attach as part of Exhibit B an explanatory schedule disclosing and supporting by individual line item the major elements of annual capital expenditures for sustaining capital. Further classify these annual capital expenditures into both (1) investments required to maintain the smelter versus investments in smelter expansion and improvements and (2) direct facility versus joint-use facility investments. Explain the method used for allocating capital expenditures on joint-use facilities to the smelter's operations.

*Line 07—Total Smelter Sustaining Capital.* Enter for each year the total of Lines 01 through 06. Transfer the reported total for each year to Schedule C.4, Line 06.

Schedule C.3—Historical Capital Investment In Constant Dollars

*General.* Use Schedule C.3 to report the end-of-period asset investments and current liabilities for the most recent fiscal year: (a) expressed in nominal dollars as of the date of the original transaction, and (b) expressed in the current year's dollars, i.e. 1984 dollars. The value of net investment in constant dollars (1984 dollars for smelters applying for an NSO in 1984) is used in Schedule C.4 as the benchmark of the Rate of Return Test.

Applicants should complete Schedule C.3 according to the following instructions. Transfer into the first column of Schedule C.3 the historical cost figures that are reported in the last (1983) column of Table A.4. In the second column of Schedule C.3, report the figures from the first column of Schedule C.3, expressed in constant (1984) dollars.

Convert each nominal dollar figure of the first column into constant (1984) dollars in accordance with the historical cost/constant dollar accounting method defined in Financial Accounting Standards Board (FASB) Statement No. 33 (Docket Item No. IV-A-6d), with the following exception: the applicant must not report the lower recoverable amount as required by FASB No. 33. Attach explanatory supporting schedules as part of Exhibit B.

Schedule C.4—Rate of Return Test

*General.* Applicants must complete this Schedule and/or Schedule B.7 and the accompanying schedules if they seek eligibility for an NSO. The line items in Schedule C.4 are explained in the following instructions.

*Line 01—Net Income from Operations.* Enter for each year the amounts reported in Schedule C.1, Line 24.

*Lines 02 and 03—Depreciation and Amortization*. Enter for each year the amounts reported in Schedule C.1, Lines 17 and 18, respectively.

*Line 04—Operating Cash Flow*. Enter for each year the total of amounts reported on Lines 01 through 03.

*Line 05—Constant Controls Capital Investment*. Enter the estimated capital outlays for constant controls for the years during which outlays would be made. These values shall correspond to the constant control investment estimates shown in the supporting schedules for Line 17 of Schedule C.1. Changes in working capital investment due to investment in constant controls facilities may be added to the capital investment estimates shown in the supporting schedules for Schedule C.1.

*Line 06—Sustaining Capital*. Enter for each year the amounts reported in Schedule C.2, Line 07.

*Line 07—Total*. Enter for each year the sum of Lines 05 and 06.

*Line 08—Net Cash Flow Projections*. Enter for each year the difference between Lines 04 and 07.

*Line 09—Discount Factors*. Enter the discount factor for each year, computed as described in the instructions under Section 2.6.

*Line 10—Present Value of Future Cash Flows*. Enter for each year the product of Lines 08 and 09.

*Line 11—Horizon Value*. Enter under the Total column the estimated horizon value of the smelter reported in Schedule C.5, Line 16.

*Line 12—Discount Factor*. Enter under the Total column the appropriate discount factor, computed as described in the instructions under Section 2.6.

*Line 13—Present Value of Horizon Value*. Enter under the Total column the product of Lines 11 and 12.

*Line 14—Present Value of Future Cash Flows*. Enter under the Total column the sum of amounts previously reported on Line 10 for 1984 through 1990.

*Line 15—Total Present Value*. Enter the sum of Lines 13 and 14.

*Line 16—Net Smelter Capital Investment in Constant Dollars*. Enter under the Total column the amount reported in the second (Constant Dollar) column of Schedule C.3, Line 26 if the value is greater than zero. If the value is zero or less, enter zero.

*Line 17—Net Present Value*. Enter the difference between Lines 15 and 16. Applicants reporting a negative net present value will pass the Rate of Return Test.

### Schedule C.5—Horizon Value of Cash Flows for the Rate of Return Test

*General*. The applicant should use Schedule C.5 to calculate the horizon value of net cash flow projections for the Rate of Return Test. This horizon value is used in Schedule C.4. The computation of the horizon value is different for this test than for the Profit Protection Test because this test requires the reporting of depreciation for tax purposes.

In Schedule C.5, the applicant removes the tax savings of constant controls depreciation from the cash flows for the last two forecast years. A depreciation-free horizon value is then calculated from these depreciation-free cash flows. The tax savings of constant controls depreciation during the horizon years are then calculated separately. The final horizon value is equal to the sum of the depreciation-free horizon value and the tax savings from depreciation of constant controls accruing over the horizon years. The line items in Schedule C.5 are explained in the following instructions.

*Line 01—Net Cash Flow Projections*. Enter for each of the final two forecast years the values in Schedule C.4, Line 08, for the corresponding years.

*Line 02—Depreciation and Amortization*. Enter for each of the final two forecast years the value in Schedule C.4, Line 02, for the corresponding years.

*Line 03—Marginal Tax Rate*. Enter for each of the final two forecast years the marginal income tax rate applicable to the smelter. This rate should incorporate both Federal and State tax liability.

*Line 04—Tax Savings*. Enter for each of the final two forecast years the product of Lines 02 and 03.

*Line 05—Nominal Dollar Values*. Enter for each of the final two forecast years the difference between Lines 01 and 04.

*Line 06—1990 Dollar Values*. For each of the final two forecast years the nominal dollar values must be expressed in the last forecast year's dollars (1990 dollars). Transfer the 1990 amount in Line 05 directly to Line 06. Inflate the 1989 amount to 1990 dollars using the forecast GNP price deflator.

*Line 07—Average*. Enter under the Total column the average of the two values in Line 06.

*Line 08—Horizon Factor*. Enter under the Total column the horizon factor provided in Section 2.7.

*Line 09—Depreciation-free Horizon Value*. Enter under the Total column the product of Lines 07 and 08.

*Line 10—Depreciation and Amortization*. Enter for each year of the horizon period depreciation charges associated with the smelter's investment in equipment and facilities related to pollution controls. These investments should include those actually made and those required to be made by the end of the forecast period. Reported charges should be computed in accordance with depreciation and amortization methods adopted for tax reporting purposes by the firm. Attach as part of Exhibit B supporting schedules consistent with those supporting Line 17 in Schedule C.1.

*Line 11—Marginal Tax Rate*. Enter for each year of the horizon period the marginal income tax rate applicable to the smelter. This rate should incorporate both Federal and State tax liability.

*Line 12—Tax Savings*. Enter for each year of the horizon period the product of Lines 10 and 11.

*Line 13—Discount Factors*. Enter the discount factor for each year of the horizon period. This shall be computed according to the instructions under Section 2.6, except that the variable N found in the discount factor formula represents the number of years in the future, *counting from the last forecast year*. For example, N=1 for the first year of the horizon period.

*Line 14—Present Value of Tax Savings*. Enter for each year of the horizon period the product of Lines 12 and 13.

*Line 15—Total Present Value of Tax Savings*. Enter under the Total column the sum of values on Line 14 for the horizon years.

*Line 16—Horizon Value*. Enter under the Total column the sum of Lines 09 and 15.

### Schedule D.1—Interim Controls Revenue Forecast

*General*. Use Schedule D.1 to report annual forecasts of operating revenues anticipated during the years 1984 through 1990 from operation of the smelter applying for an interim controls waiver. The applicant applying for a permanent waiver should complete Schedule D.1 twice, with revenue and production projections based on two alternative assumptions: (1) Installation of interim constant control equipment, no installation of any additional $SO_2$ controls that the smelter would otherwise be required to install but for the issuance of an NSO, and closure after January 1, 1988, and (2) installation of interim constant control equipment and any additional $SO_2$ controls required to comply with the smelter's SIP emission limitation by January 2, 1988, so that the smelter will remain open through the horizon period. The applicant applying for a temporary waiver should use only the first assumption. For a smelter that has no continuous emission controls, the assumed interim control investment program should be based on the installation and operation of a well-designed sulfuric acid plant to treat all strong gas streams. For a smelter that already has some continuous emission controls, the assumed interim constant control investment should be based on the installation and operation of any additional acid plant capacity that would be necessary for treatment of all strong streams with interim constant controls. The interim controls projections should account for other regulatory requirements on the same basis as provided for in the NSO eligibility tests.

Forecast smelter revenues should be expressed on a tolling service equivalent basis as described in Section 2.3.4. The line items in Schedule D.1 are explained in the following instructions. Attach as part of Exhibit B schedules to (1) explain the methods used to make the required forecasts, (2) explain differences, if any, between historical trends and the forecasts, and (3) provide data and information to support the forecasts.

*Lines 01 and 05—Concentrates Processed*. Report for each year the forecast quantity of concentrates processed for unaffiliated parties (Line 01) and affiliated parties (Line 05).

*Lines 02 and 06—Smelting Charge*. Report for each year the forecast smelting charge for unaffiliated parties (Line 02) and affiliated parties (Line 06). See Section 2.4 for forecast copper smelting charges furnished by EPA.

*Lines 03 and 07—Total Smelter Revenues*. Report for each year the forecast total operating revenues derived from processing concentrates. The total for unaffiliated parties (Line 03) is equal to the product of Lines 01, 02, and 04, and for affiliated parties (Line 07), the product of Lines 05, 06, and 08.

*Lines 04 and 08—Average Product Grade*. Report for each year the forecast average quality rating assigned to concentrates processed for unaffiliated parties (Line 04) and affiliated parties (Line 08).

*Line 09—Total Co-Product Revenues*. Report for each year the forecast net revenues from sales of co-products derived from the smelter's operations. Attach as part of Exhibit B a schedule showing by individual type of co-product the forecast quantity produced and sold, forecast market price per unit of sales, and forecast total revenues derived from the co-product sales.

*Line 10—Total By-product Revenues From Pollution Control Facilities*. Report for each year forecast revenues from the sale of by-products derived from operation of the smelter's pollution control facilities. Attach as part of Exhibit B a schedule showing by type of by-product produced (e.g., sulfuric acid) the forecast quantity of output, forecast market price per unit of output sold, and forecast total revenue derived from the by-product sales.

*Line 11—Total By-product Revenues From Other Smelter Processing*. Report forecast revenues from the sales of gold, silver, and other by-products derived from the smelter's operations. Attach as part of Exhibit B a schedule providing additional documentation as specified in the instructions for Line 10.

*Line 12—Total Co-product and By-product Revenues*. Enter for each year the total of Lines 09 through 11.

### Schedule D.2—Interim Controls Cost Forecast

*General*. Use Schedule D.2 to report annual forecasts of operating costs anticipated during the years 1984 through 1990 from operation of the smelter applying for an interim controls waiver. The applicant applying for a

permanent waiver should complete Schedule D.2 twice, with cost and production projections based on two alternative assumptions: (1) Installation of interim constant control equipment, no installation of any additional $SO_2$ controls that the smelter would otherwise be required to install but for the issuance of an NSO, and closure after January 1, 1988, and (2) installation of interim constant control equipment and any additional $SO_2$ controls required to comply with the smelter's SIP emission limitation by January 2, 1988, so that the smelter will remain open through the horizon period. For a smelter that has no continuous emission controls, the assumed interim control investment program should be based on the installation and operation of a well-designed sulfuric acid plant to treat all strong gas streams. For a smelter that already has some continuous emission controls, the assumed interim constant control investment should be based on the installation and operation of any additional acid plant capacity that would be necessary for treatment of all strong streams with interim constant controls. The interim controls projections should account for other regulatory requirements on the same basis as provided for in the NSO eligibility tests.

The line items in Schedule D.2 are explained in the following instructions. Attach as part of Exhibit B schedules to (1) explain the methods used to make the required forecasts, (2) explain differences, if any, between historical trends and the forecasts, and (3) provide data and information to support the forecasts.

*Line 01—Direct Labor Hours.* Report for each year the quantity of direct labor hours required to support the processing levels previously reported. Attach as part of Exhibit B an explanation of the labor productivity factors involved.

*Line 02—Average Hourly Wage Rate.* Report for each year the forecast average wage rate per unit of direct labor input. Attach as part of Exhibit B a description of direct labor cost factors under any existing labor contracts that extend to the forecast period and an explanation of the methodology used to forecast wage rates. EPA-provided forecast wage indices are reported in Section 2.4.

*Line 03—Total Wage Payments.* Enter for each year the product of Lines 01 and 02.

*Line 04—Supplemental Employee Benefits.* Report for each year adjustments required to direct labor costs for other employee compensation under supplemental benefit plans. Attach as part of Exhibit B a description of such plans and their costs and an explanation of the methodology used to forecast such costs. EPA-provided forecast wage indices are reported in Section 2.4.

*Line 05—Total Production Labor Costs.* Enter for each year the total of Lines 03 and 04.

*Lines 06, 09, 12, 15, and 18—Energy Quantities.* Report for each year the quantity of energy by type required to support the processing levels reported in the smelter's revenue. Attach as part of Exhibit B an explanation of energy characteristics and use factors considered in forecasting the smelter's future energy requirements.

*Lines 07, 10, 13, 16, and 19—Unit Prices.* Report for each year the forecast price per unit of energy input by type of energy. Attach as part of Exhibit B a description of the energy price factors under any existing energy contracts that extend to the forecast period and an explanation of the methodology used to forecast unit energy prices. EPA-provided forecast energy indices are reported in Section 2.4.

*Lines 08, 11, 14, 17, and 20—Total Payments.* Enter for each year the products of quantity and prices paid for electricity (Lines 06×07), natural gas (Lines 09×10), coal (Lines 12×13), fuel oil (Lines 15×16), and other (Lines 18×19).

*Line 21—Total Energy Costs.* Enter for each year the total of Lines 08, 11, 14, 17, and 20.

### Schedule D.3—Interim Controls Forecast Profit and Loss Summary

*General.* Use Schedule D.3 to report forecast revenue and cost information summed in Schedules D.1 and D.2 for the years 1984 through 1990. Applicants applying for a permanent waiver must complete Schedule D.3 twice. Forecast revenues and costs in Schedule D.3 shall be compatible with productive capacity and pollution control assumptions underlying the operating revenue and cost forecasts incorporated into each set of Schedules D.1 and D.2. Applicants applying for a temporary waiver should use only the first assumption: installation of interim constant control equipment and no installation of any additional SO2 controls that the smelter would otherwise be required to install but for the issuance of an NSO. The transfer of line items from Schedules D.1 and D.2 to this Schedule is explained in the following instructions.

*Line 01—Smelter Revenues—Unaffiliated Parties.* Enter the totals reported in Schedule D.1, Line 03.

*Line 02—Smelter Revenues-Affiliated Parties.* Enter the totals reported in Schedule D.1, Line 07.

*Line 03—Co-product and By-product Sales Revenues.* Enter the totals reported in Schedule D.1, Line 12.

*Line 04—Other Operating Revenues.* Report operating revenues anticipated from sources not accounted for under Lines 01 through 03. Refer to instructions for Line 04 of Schedule A.3 for items that should not be included in ''Other Operating Revenues.'' Attach as part of Exhibit B a schedule showing annual amounts forecast by individual revenue component for ''other'' operating revenues associated with the smelter's forecast interim

controls operations. Identify in the supporting schedule any differences in the ''other'' revenue components reported in this Schedule and Schedule A.3 and explain the reasons for such differences.

*Line 05—Total Operating Revenues*. Enter for each year the total of Lines 01 through 04.

*Line 06—Material Costs*. Report total costs forecast for flux, refractories, coke and other materials directly associated with the smelter's processing of concentrates. Attach as part of Exhibit B a schedule showing the annual amounts forecast by major material cost components. For each cost component, identify the forecast quantity and unit price elements of material cost and explain the basis for forecasting these quantity and price elements. Identify in the supporting schedule any differences in the ''other'' material cost components shown in this Schedule and Schedule A.3 and explain the reasons for such differences.

*Line 07—Production Labor Costs*. Enter the totals reported in Schedule D.2, Line 05.

*Line 08—Energy Costs*. Enter the totals reported in Schedule D.2, Line 21.

*Line 09—Pollution Control Costs*. Report the total costs forecast for operation and maintenance of all pollution control equipment and facilities under the two alternative sets of assumptions made in corresponding Schedules D.1 and D.2. Byproduct credits associated with operation of the pollution control facilities should be eliminated from the cost accounts, reclassified to Schedule D.1, Line 10 and included in Line 03 of this Schedule. Attach a schedule as part of Exhibit B classifying pollution control costs by major cost components. Explain the basis used for estimating each of the cost components.

*Line 10—Production Overhead Costs*. Report the total costs forecast for indirect labor, indirect materials and other production overhead costs associated with the smelter's constant controls forecasts. Attach as part of Exhibit B a schedule showing annual overhead costs projected by major cost components associated with the smelter's operations. For each cost component, where appropriate, identify the forecast quantity and unit price elements of overhead costs and explain the basis for estimating these quantity and price elements. Also identify in the supporting schedule any differences in production overhead cost classifications used in this Schedule and Schedule A.3 and explain the reasons for such differences.

*Line 11—Other Production Costs*. Report other forecast production costs not previously reported on lines 06 through 10. Attach as part of Exhibit B supporting schedules showing the basis of the forecasts.

*Line 12—Total Cost of Sales*. Enter for each year the sum of operating costs reported on Lines 06 through 11.

*Line 13—Gross Operating Profit*. Enter for each year the difference between Lines 05 and 12.

*Line 14—Selling, General and Administrative Expenses*. Report the total costs forecast for administrative, marketing and general corporate overhead functions that directly or indirectly support the smelter's operations. Refer to the NSO Financial Reporting Overview for general discussion of indirect cost allocations from overhead cost pools. Attach as part of Exhibit B a schedule classifying selling, general and administrative expenses into major cost components. Indicate whether each component represents costs directly assignable to the smelter or indirect costs allocated from other business segments to the smelter. Explain the basis used for estimating the amount of expected costs included in each component and the basis used for allocating indirect cost elements to the smelter. Identify and explain any differences between the selling, general and administrative cost classification used in this Schedule and that used in Line 15 of Schedule A.3.

*Line 15—Taxes, Other than Income Taxes*. Report the total costs forecast for property taxes and associated levies paid to governmental units by or for the benefit of the smelter operation. Attach as part of Exhibit B a schedule classifying operating taxes by major component. Indicate whether each component represents taxes directly assignable to the smelter or taxes that have been allocated among more than one facility. Explain the basis used for estimating taxes and the basis for any allocation of taxes to the smelter. Identify and explain any differences between the component classifications used in this Schedule and those used in Line 16 of Schedule A.3.

*Line 16—Research Costs*. Report the estimates of research costs incurred directly by or for the benefit of the smelter operations. Attach as part of Exhibit B a schedule classifying the costs by major direct and indirect cost components. Explain the basis for estimating the costs assigned to each component. Identify and explain any differences between classifications used in this Schedule and those used in Line 17 of Schedule A.3.

*Line 17—Pollution Control Facility Depreciation and Amortization*. Report the estimates of depreciation and amortization charges associated with the smelter's actual and forecast investment in all pollution control equipment and facilities under the two alternative sets of assumptions made in corresponding Schedules D.1 and D.2. Reported charges should be computed in accordance with depreciation and amortization methods adopted for tax reporting purposes by the firm. Attach explanatory supporting schedules as part of Exhibit B.

*Line 18—Other Smelter Facility Depreciation and Amortization*. Report the pro forma estimates of depreciation and amortization

charges associated with the smelter's investment in equipment and facilities other than those classified as pollution control facilities. Attach explanatory supporting schedules as part of Exhibit B.

*Line 19—Interest on Short-Term Debt.* Report the estimates of interest and other financing charges on forecast short-term obligations as classified in the smelter's current liabilities on Schedule A.4. Interest and associated financing charges on long-term debt should not be included as an expense identifiable with the smelter's operations. Attach as part of Exhibit B a schedule showing the interest-bearing, short-term debt contracts identifiable with the smelter's operations, the interest rate projected for these contracts, and the estimated annual interest charges. Identify and explain any differences between the classifications used in this Schedule and those used in Line 20 of Schedule A.3.

*Line 20—Miscellaneous Operating Expenses.* Report only the total operating expenses associated with or allocated to the smelter that cannot be appropriately classified in one of the preceding line items. Attach as part of Exhibit B a schedule showing the classification of these residual operating expenses into major cost components. Explain the basis used for forecasting the cost under each component. Identify each cost component in terms of direct or indirect cost and explain the basis used for allocating the indirect costs to smelter operations. Identify and explain any differences between cost classifications included in this Schedule and those used in Line 21 of Schedule A.3.

*Line 21—Total Other Operating Expenses.* Enter for each year the sum of operating costs reported on Lines 14 through 20.

*Line 22—Income From Operations.* Enter for each year the difference between Lines 21 and 13.

*Line 23—Income Taxes.* Enter the product of income from operations (Line 22) and the sum of the Federal, State and local marginal tax rates. Attach as part of Exhibit B a schedule detailing the estimated marginal tax rate by taxing entity.

*Line 24—Net Income From Operations.* Enter for each year the difference between Lines 23 and 22.

The temporary waiver from interim controls test is on Line 13 of Schedule D.3 that was completed under the assumption of installation of interim constant control equipment and no installation of any additional $SO_2$ controls that the smelter would otherwise be required to install but for the issuance of an NSO. Applicants will be eligible for a temporary waiver from the interim development of constant control technology for sulfur dioxide emissions if the reported gross operating profit on Line 13 is a negative value for one or more years during which the NSO is in effect.

Schedule D.4—Interim Controls Sustaining Capital Investment Forecast

*General.* Use Schedule D.4 to report yearly sustaining capital outlays for maintenance of the smelter's existing productive capability. The applicant should complete Schedule D.4 twice, under two alternative assumptions: (1) Installation of interim constant control equipment, no installation of any additional $SO_2$ controls that the smelter would otherwise be required to install but for the issuance of an NSO, and closure after January 1, 1988, and (2) installation of interim constant equipment and any additional $SO_2$ controls required to comply with the smelter's SIP emission limitation by January 2, 1988, so that the smelter will remain open through the horizon period.

Major elements of these outlays should be disclosed, as well as the total of such outlays. Estimates shall be restricted to those items that will be capitalized for tax purposes. These outlays shall primarily be for plant replacement, although outlays for improvements and expansion may be included to the extent that improvements and/or expansion, exclusive of required pollution control outlays, can be justified as economically feasible. Estimates of sustaining capital investments shall exclude any incremental investment for sulfur dioxide emission controls reported in Line 06 of Schedule D.6. Sustaining capital investments in facilities shared with other operating segments shall be allocated in accordance with the instructions given below.

Estimates of sustaining capital shall be compatible with productive capacity and pollution control requirements underlying the operating revenue and cost forecasts incorporated in Schedule D.3.

*Line 01 to 06—Sustaining Capital.* Report for each year by individual line item property, plant and equipment sustaining capital investments assignable to smelter operations. Include both (1) property, plant and equipment directly associated with the smelter's operations and (2) facilities shared with other operating segments to the extent that a causal and beneficial relationship can be established for the intersegment allocations of such facility investments.

Attach as part of Exhibit B an explanatory schedule disclosing and supporting by individual line item the major elements of annual capital expenditures for sustaining capital. Further classify these annual capital expenditures into both (1) investments required to maintain the smelter versus investments in smelter expansion and improvements and (2) direct facility versus joint-use facility investments. Explain the method used for allocating capital expenditures on joint-use facilities to the smelter's operations.

*Line 07—Total Smelter Sustaining Capital.* Enter for each year the total of Lines 01 through 06. Transfer the reported total for each year to Schedule D.6, Line 06.

Schedule D.5—Cash Proceeds From Liquidation

*General.* Use Schedule D.5 to calculate cash proceeds from liquidation. Applicants should determine the current salvage value of their existing investment in the smelter as the net proceeds that could be derived through an orderly liquidation of the smelter's assets. The net cash proceeds should be reported after an appropriate allowance for disposal costs, contractual claims against the smelter (e.g., labor termination penalties), and income tax effects on the corporation of such liquidation costs.

The applicant must stipulate the most advantageous alternative market (use) for the smelter's facilities. Generally, this market will be:

Secondary market for used plant and equipment.

Sale for scrap.

Abandonment where the disposal cost exceeds scrap value.

The current net salvage value should be disaggregated into the same property, plant and equipment asset groups reported under the historical capital investment summary, Schedule A.4. The line items in Schedule D.5 are explained in the following instructions.

*Line 01—Current Assets.* Enter in Columns 1 and 2, the value of total current assets shown in Line 08 of Schedule A.4 (Historical Capital Investment Summary) for 1983. No gain or loss should be reported in Columns 3 through 5 for the liquidation of current asset investments.

*Lines 02–07—Property Plant and Equipment.* Enter in Column 1 the appraised liquidation value (in terms of pretax cash proceeds) of the smelter by asset group. This estimate should be certified by a qualified third party professional appraiser and shall represent the best use and highest alternative value of these assets. The liquidation value of any assets which are jointly used by the smelter and other operating segments shall be excluded if, upon closure of the smelter, such assets would continue in service for the non-smelter activity.

In Column 2, report the net book value of these assets for which liquidation values have been reported in Column 1. The reported values should correspond with amounts reported for 1982 in lines 09 through 15 in Schedule A.4 as adjusted for appropriate eliminations of joint-use facilities and reconciliation to a net book value as reported for income taxes. Attach as part of Exhibit B supporting schedules showing all adjustments and conversion of the net book value as reported on the financial statements, to net book value that would be used for income tax purposes.

Compute Column 3 as Column 1 less Column 2. The gain (or loss) shown in Column 3 shall be segregated into ordinary income and capital gains components subject to taxation pursuant to applicable income tax rules. Enter ordinary income in Column 4 and capital gains in Column 5.

*Line 08—Total Smelter Investment.* Enter the sum of Lines 02 through 07 for each of the columns.

*Line 09—Other Non-current Assets.* In Column 1, report the appraised value of other non-current assets in accordance with the instructions for Line 18, Schedule A.4, except that any joint asset(s) that would continue in the event of smelter liquidation shall be excluded. This estimate shall be certified by a qualified third-party professional appraiser.

In Column 2, report the net book value of the non-current assets directly corresponding to those assets included in the liquidation value estimated under Column 1.

The remaining columns shall be completed in accordance with the instructions given above for Lines 02 and 06.

*Line 10—Total Smelter Value.* Enter the sum of Lines 01, 08 and 09.

*Line 11—Total Current Liabilities.* Report in both Columns 1 and 2, the value of total current liabilities shown in Line 25 of Schedule A.4 for 1983.

*Line 12—Gross Liquidation Value.* Enter the difference between Lines 10 and 11.

*Line 13—Liquidation Costs.* In Columns 1, 3 and 4, report the value of any liquidation costs such as labor contract termination penalties, severance pay and related costs, associated with closure of the smelter.

*Line 14—Taxable Gain (or Loss).* Enter in Columns 4 and 5, the differences between Lines 12 and 13.

*Line 15—Income Tax Rate.* Enter the sum of the Federal, State and local marginal tax rates of the firm for ordinary income and capital gains in Columns 4 and 5, respectively. Attach as part of Exhibit B a schedule detailing the estimated marginal tax rate by taxing entity.

*Line 16—Income Tax on Gain (or Loss).* In Columns 4 and 5, enter the product of Line 14 and the marginal income tax rates reported in Line 15. In Column 1, enter the sum of Columns 4 and 5.

*Line 17—After Tax Cash Proceeds.* Enter in Column 1 the difference between Line 12 and the sum of Lines 13 and 16.

Schedule D.6—Permanent Waiver from Interim Controls Test

*General.* Applicants must complete this Schedule and its supporting schedules if they seek a permanent waiver from interim control requirements. The applicant should complete Schedule D.6 twice, with revenue

and production projections based on two alternative assumptions: (1) Installation of interim constant control equipment, no installation of any additional $SO_2$ controls that the smelter would otherwise be required to install but for the issuance of an NSO, and closure after January 1, 1988, and (2) installation of interim constant control equipment and any additional $SO_2$ controls required to comply with the smelter's SIP emission limitation by January 2, 1988, so that the smelter will remain open through the horizon period. Forecasts in Schedule D.6 shall be compatible with assumptions and forecasts in each set of Schedules D.1 through D.4. The line items in Schedule D.6 are explained in the following instructions.

*Line 01—Net Income from Operations*. Enter for each year the amounts reported in Schedule D.3, Line 24.

*Line 02—Net Income Adjustments*. Enter any adjustments to net income not included in Schedule D.3. When assuming closure after January 1, 1988, the applicant must include the proceeds from liquidation in 1988. The applicant must estimate liquidation value as of 1988 using one of two methods: (1) the applicant may complete Schedule D.5 assuming liquidation in 1988 and report the value of after-tax cash proceeds in Line 17; or (2) the applicant may use the value of after-tax cash proceeds in Line 17 of Schedule D.5, as already completed, assuming liquidation in the current (application) year, and expressing values in 1988 dollars. The current liquidation value must be inflated to 1988 dollars by applying the appropriate forecast percentage rate changes in the GNP price deflator. Attach explanatory supporting schedules in Exhibit B.

*Lines 03 and 04—Depreciation and Amortization*. Enter for each year the amounts reported in Schedule D.3, Lines 17 and 18, respectively.

*Line 05—Operating Cash Flow*. Enter for each year the total of amounts reported on Lines 01 through 04.

*Line 06—Pollution Controls Capital Investment*. Enter the estimated pollution control capital outlays projected to be made under the two alternative sets of assumptions described in the *General* section of this schedule. These controls shall include only interim control equipment for the first set of assumptions and both interim control equipment and any additional $SO_2$ controls required to comply with the smelter's SIP emission limitation by January 2, 1988, for the second set of assumptions. The values assumed in this schedule shall correspond to the investment estimates shown in each set of supporting schedules for Line 17 of Schedule D.3. For purposes of allocating costs of the additional $SO_2$ controls under the second set of assumptions, applicants must provide information establishing the period over which capital outlays for such controls would be made if installation of the controls begins the latest date that would still allow compliance to be achieved by January 2, 1988. Changes in working capital investment due to investment in control facilities may be added to the capital investment estimates shown in the corresponding supporting schedules for Schedule D.3.

*Line 07—Sustaining Capital*. Enter for each year the amounts reported in Schedule D.4, Line 07.

*Line 08—Total*. Enter for each year the sum of Lines 05 and 06.

*Line 09—Net Cash Flow Projections*. Enter for each year the difference between Lines 04 and 07.

*Line 10—Discount Factors*. Enter the discount factor for each year, computed as described in the instructions under Section 2.6.

*Line 11—Present Value of Future Cash Flows*. Enter for each year the product of Lines 08 and 09.

*Line 12—Horizon Value*. Enter under the Total column the estimated horizon value of the smelter reported in Schedule D.7, Line 16.

*Line 13—Discount Factor*. Enter under the Total column the appropriate discount factor, computed as described in the instructions under Section 2.6.

*Line 14—Present Value of Horizon Value*. Enter under the Total column the product of Lines 11 and 12.

*Line 15—Present Value of Future Cash Flows*. Enter under the Total column the sum of amounts previously reported on Line 10 for 1984 through 1990.

*Line 16—Total Present Value*. Enter the sum of Lines 13 and 14.

*Line 17—Current Salvage Value*. Enter the amount reported in Schedule D.5, Line 17, if the value is greater than zero. If the value is zero or less, enter zero.

*Line 18—Net Present Value*. Enter the difference between Lines 16 and 17. In determining eligibility for a permanent waiver from interim control requirements, an applicant must use the higher of the two net present value figures computed under the two alternative assumptions. Applicants reporting a negative value for the higher net present value figure will be eligible for a permanent waiver from interim use of a constant control system for sulfur dioxide emissions.

### Schedule D.7—Horizon Value of Cash Flows for the Interim Controls Test

*General*. Use Schedule D.7 to calculate the horizon value of net cash flow projections for the Interim Controls Test. This horizon value is used in Schedule D.6. The computation of the horizon value is different for this test than for the Profit Protection Test because this test requires the reporting of depreciation for tax purposes.

In Schedule D.7, the applicant removes the tax savings of control equipment depreciation from the cash flows for the last two forecast years. A depreciation-free horizon value is then calculated from these depreciation-free cash flows. The tax savings of constant controls depreciation during the horizon years are then calculated separately. The final horizon value is equal to the sum of the depreciation-free horizon value and the tax savings from depreciation of constant controls accruing over the horizon years. The line items in Schedule D.7 are explained in the following instruction.

*Line 01—Net Cash Flow Projections.* Enter for each of the final two forecast years the values in Schedule D.6, Line 09, for the corresponding years.

*Line 02—Depreciation and Amortization.* Enter for each of the final two forecast years the value in Schedule D.6, Line 03, for the corresponding years.

*Line 03—Marginal Tax Rate.* Enter for each of the final two forecast years the marginal income tax rate applicable to the smelter. This rate should incorporate both Federal and State tax liability.

*Line 04—Tax Savings.* Enter for each of the final two forecast years the product of Lines 02 and 03.

*Line 05—Nominal Dollar Values.* Enter for each of the final two forecast years the difference between Lines 01 and 04.

*Line 06—1990 Dollar Values.* For each of the final two forecast years the nominal dollar values must be expressed in the last forecast year's dollars (1990 dollars). Transfer the 1990 amount in Line 05 directly to Line 06. Inflate the 1989 amount to 1990 dollars using the forecast GNP price deflator.

*Line 07—Average.* Enter under the Total column the average of the two values in Line 06.

*Line 08—Horizon Factor.* Enter under the Total column the horizon factor provided in Section 2.7.

*Line 09—Depreciation-free Horizon Value.* Enter under the Total column the product of Lines 07 and 08.

*Line 10—Depreciation and Amortization.* Enter for each year of the horizon period depreciation charges associated with the smelter's investment in equipment and facilities related to pollution controls. These investments should include those actually made and those forecast to be made by the end of the forecast period. Reported charges should be computed in accordance with depreciation and amortization methods adopted for tax reporting purposes by the firm. Attach as part of exhibit B supporting schedules consistent with those supporting Line 17 in Schedule D.3.

*Line 11—Marginal Tax Rate.* Enter for each year of the horizon period the marginal income tax rate applicable to the smelter. This rate should incorporate both Federal and State tax liability.

*Line 12—Tax Savings.* Enter for each year of the horizon period the product of Lines 10 and 11.

*Line 13—Discount Factors.* Enter the discount factor for each year of the horizon period. This shall be computed according to the instructions under Section 2.6, except that the variable N found in the discount factor formula represents the number of years in the future, *counting from the last forecast year*. For example, N=1 for the first year of the horizon period.

*Line 14—Present Value of Tax Savings.* Enter for each year of the horizon period the product of Lines 12 and 13.

*Line 15—Total Present Value of Tax Savings.* Enter under the Total column the sum of values on Line 14 for the horizon years.

*Line 16—Horizon Value.* Enter under the Total column the sum of Lines 09 and 15.

ENVIRONMENTAL PROTECTION AGENCY

*Primary Nonferrous Smelter Order Application*

Part I—Identification Information

1. Firm name _____
2. Street/Box/RFD _____
3. City _____
4. State _____
5. Zip Code _____
6. IRS Employer Identification No. _____
7. SEC 1934 Act Registration No. _____
8. Smelter Name _____
9. Street/Box/RFD _____
10. City _____
11. State _____
12. Zip Code _____
13. Contact Person _____
14. Title _____
15. Street/Box/RFD _____
16. City _____
17. State _____
18. Zip Code _____
19. Telephone _____

Part II—Certification

I certify that the information provided herein and appended hereto is true and accurate to the best of my knowledge. I understand that this information is being required, in part, under the authority of Section 114 of the Clean Air Act, 42 U.S.C. 7414.

Name _____
Title _____
Signature _____
Date _____

SCHEDULE A.1—HISTORICAL REVENUE DATA

[Smelter identification]

| | Line | 1979 | 1980 | 1981 | 1982 | 1983 |
|---|---|---|---|---|---|---|
| A. Copper product sales: | | | | | | |
| 1. Total quantity sold | 01 | | | | | |
| 2. Unaffiliated customer sales: | | | | | | |
| a. Quantity sold | 2 | | | | | |
| b. Operating revenue | 03 | | | | | |
| c. Average unit price | 04 | | | | | |
| d. Average product grade | 05 | | | | | |
| 3. Affiliated customers sales: | | | | | | |
| a. Quantity sold | 06 | | | | | |
| b. Operating revenue | 07 | | | | | |
| c. Average unit price | 08 | | | | | |
| d. Average product grade | 09 | | | | | |
| 4. Adjusted copper revenues: | | | | | | |
| a. Total copper revenues | 10 | | | | | |
| b. Transfer price adjustment | 11 | | | | | |
| c. Other revenue adjustments | 12 | | | | | |
| d. Adjusted copper revenues | 13 | | | | | |
| B. Lead product sales: | | | | | | |
| 1. Total quantity sold | 14 | | | | | |
| 2. Unaffiliated customer sales: | | | | | | |
| a. Quantity sold | 15 | | | | | |
| b. Operating revenue | 16 | | | | | |
| c. Average unit price | 17 | | | | | |
| d. Average product grade | 18 | | | | | |
| 3. Affiliated customer sales: | | | | | | |
| a. Quantity sold | 19 | | | | | |
| b. Operating revenue | 20 | | | | | |
| c. Average unit price | 21 | | | | | |
| d. Average product grade | 22 | | | | | |
| 4. Adjusted lead revenues: | | | | | | |
| a. Total lead revenues | 23 | | | | | |
| b. Transfer price adjustment | 24 | | | | | |
| c. Other revenue adjustments | 25 | | | | | |
| d. Adjusted lead revenues | 26 | | | | | |
| C. Zinc product sales: | | | | | | |
| 1. Total quantity sold | 27 | | | | | |
| 2. Unaffiliated customer sales: | | | | | | |
| a. Quantity sold | 28 | | | | | |
| b. Operating revenue | 29 | | | | | |
| c. Average unit price | 30 | | | | | |
| d. Average product grade | 31 | | | | | |
| 3. Affiliated customer sales: | | | | | | |
| a. Quantity sold | 32 | | | | | |
| b. Operating revenue | 33 | | | | | |
| c. Average unit price | 34 | | | | | |
| d. Average product grade | 35 | | | | | |
| 4. Adjusted zinc revenues: | | | | | | |
| a. Total zinc revenues | 36 | | | | | |
| b. Transfer price adjustment | 37 | | | | | |
| c. Other revenue adjustments | 38 | | | | | |
| d. Adjusted zinc revenues | 39 | | | | | |
| D. Molybdenum or other nonferrous metal sales: | | | | | | |
| 1. Total quantity sold | 40 | | | | | |
| 2. Unaffiliated customer sales: | | | | | | |
| a. Quantity sold | 41 | | | | | |
| b. Operating revenue | 42 | | | | | |
| c. Average unit price | 43 | | | | | |
| d. Average product grade | 44 | | | | | |
| 3. Affiliated customer sales: | | | | | | |
| a. Quantity sold | 45 | | | | | |
| b. Operating revenue | 46 | | | | | |
| c. Average unit price | 47 | | | | | |
| d. Average product grade | 48 | | | | | |
| 4. Adjusted molybdenum or other nonferrous metal revenues: | | | | | | |
| a. Total molybdenum or other nonferrous metal revenues | 49 | | | | | |
| b. Transfer price adjustment | 50 | | | | | |
| c. Other revenue adjustments | 51 | | | | | |
| d. Adjusted molybdenum or other nonferrous metal revenues | 52 | | | | | |

SCHEDULE A.1—HISTORICAL REVENUE DATA—Continued

[Smelter identification]

| | Line | 1979 | 1980 | 1981 | 1982 | 1983 |
|---|---|---|---|---|---|---|
| E. Primary metal revenues | 53 | | | | | |
| F. Tolling service revenues: | | | | | | |
| 1. Total toll concentrates processed | 54 | | | | | |
| 2. Unaffiliated customer revenues: | | | | | | |
| a. Concentrates processed | 55 | | | | | |
| b. Operating revenue | 56 | | | | | |
| c. Average unit price | 57 | | | | | |
| d. Average product grade | 58 | | | | | |
| 3. Affiliated customer revenues: | | | | | | |
| a. Concentrates processed | 59 | | | | | |
| b. Operating revenue | 60 | | | | | |
| c. Average unit price | 61 | | | | | |
| d. Average product grade | 62 | | | | | |
| 4. Adjusted tolling service revenues: | | | | | | |
| a. Total tolling service revenue | 63 | | | | | |
| b. Transfer price adjustment | 64 | | | | | |
| c. Other revenue adjustments | 65 | | | | | |
| d. Adjusted tolling service revenues | 66 | | | | | |
| G. Coproduct and byproduct sales: | | | | | | |
| 1. Total coproduct revenues | 67 | | | | | |
| 2. Total byproduct revenues: | | | | | | |
| a. Pollution control facilities | 68 | | | | | |
| b. Other smelter processing | 69 | | | | | |
| 3. Total coproduct and byproduct revenues | 70 | | | | | |

SCHEDULE A.2—HISTORICAL COST DATA

[Smelter identification]

| | Line | 1979 | 1980 | 1981 | 1982 | 1983 |
|---|---|---|---|---|---|---|
| A. Concentrate costs: | | | | | | |
| 1. Total quantity purchased | 01 | | | | | |
| 2. Unaffiliated purchases: | | | | | | |
| a. Quantity purchased | 02 | | | | | |
| b. Concentrate cost | 03 | | | | | |
| c. Average unit price | 04 | | | | | |
| d. Average concentrate grade | 05 | | | | | |
| 3. Affiliated purchases: | | | | | | |
| a. Quantity purchased | 06 | | | | | |
| b. Concentrate cost | 07 | | | | | |
| c. Average unit price | 08 | | | | | |
| d. Average concentrate grade | 09 | | | | | |
| 4. Adjusted concentrate costs: | | | | | | |
| a. Total concentrate costs | 10 | | | | | |
| b. Transfer price adjustment | 11 | | | | | |
| c. Other cost adjustments | 12 | | | | | |
| d. Adjusted concentrate cost | 13 | | | | | |
| B. Production labor cost: | | | | | | |
| 1. Direct labor hours | 14 | | | | | |
| 2. Average hourly wage rate | 15 | | | | | |
| 3. Total wage payments | 16 | | | | | |
| 4. Supplemental employee benefits | 17 | | | | | |
| 5. Total production labor cost | 18 | | | | | |
| C. Energy costs: | | | | | | |
| 1. Electricity: | | | | | | |
| a. Quantity in kilowatt hours | 19 | | | | | |
| b. Price per kwh | 20 | | | | | |
| c. Total electricity payments | 21 | | | | | |
| 2. Natural gas: | | | | | | |
| a. Quantity in mcf | 22 | | | | | |
| b. Price per mcf | 23 | | | | | |
| c. Total natural gas payments | 24 | | | | | |
| 3. Coal: | | | | | | |
| a. Quantity in tons | 25 | | | | | |
| b. Price per ton | 26 | | | | | |
| c. Total coal payments | 27 | | | | | |
| 4. Fuel oil: | | | | | | |
| a. Quantity in gallons | 28 | | | | | |
| b. Price per gallon | 29 | | | | | |
| c. Total fuel oil payments | 30 | | | | | |

SCHEDULE A.2—HISTORICAL COST DATA—Continued

[Smelter identification]

| | Line | 1979 | 1980 | 1981 | 1982 | 1983 |
|---|---|---|---|---|---|---|
| 5. Other (specify): | | | | | | |
| a. Quantity (specific units) | 31 | | | | | |
| b. Price per unit | 32 | | | | | |
| c. Total payments | 33 | | | | | |
| 6. Total energy costs | 34 | | | | | |

SCHEDULE A.3—HISTORICAL PROFIT AND LOSS SUMMARY

[Smelter identification]

| | Line | 1979 | 1980 | 1981 | 1982 | 1983 |
|---|---|---|---|---|---|---|
| A. Operating revenues: | | | | | | |
| 1. Primary metal sales | 01 | | | | | |
| 2. Coproduct and byproduct sales | 02 | | | | | |
| 3. Tolling service revenues | 03 | | | | | |
| 4. Other operating revenues | 04 | | | | | |
| 5. Total operating revenues | 05 | | | | | |
| B. Cost of sales: | | | | | | |
| 1. Concentrates processed | 06 | | | | | |
| 2. Other materials | 07 | | | | | |
| 3. Production labor | 08 | | | | | |
| 4. Energy costs | 09 | | | | | |
| 5. Pollution control cost | 10 | | | | | |
| 6. Production overhead | 11 | | | | | |
| 7. Other production costs | 12 | | | | | |
| 8. Total cost of sales | 13 | | | | | |
| C. Gross operating profit | 14 | | | | | |
| D. Other operating expenses: | | | | | | |
| 1. Selling general and administrative | 15 | | | | | |
| 2. Taxes, other than income tax | 16 | | | | | |
| 3. Research costs | 17 | | | | | |
| 4. Depreciation and amortization: | | | | | | |
| a. Pollution control facilities | 18 | | | | | |
| b. Other smelter facilities | 19 | | | | | |
| 5. Interest on short term debt | 20 | | | | | |
| 6. Miscellaneous operating expenses | 21 | | | | | |
| 7. Total other operating expenses | 22 | | | | | |
| E. Income from operations | 23 | | | | | |
| F. Other income and (expense): | | | | | | |
| 1. Gain/(loss) on disposition of property | 24 | | | | | |
| 2. Miscellaneous other income and (expense) | 25 | | | | | |
| 3. Total other income and (expense) | 26 | | | | | |
| G. Net taxable income | 27 | | | | | |

SCHEDULE A.4—HISTORICAL CAPITAL INVESTMENT SUMMARY

[Smelter identification]

| | Line | 1979 | 1980 | 1981 | 1982 | 1983 |
|---|---|---|---|---|---|---|
| A. Current assets: | | | | | | |
| 1. Cash on hand and deposit | 01 | | | | | |
| 2. Temporary cash investments | 02 | | | | | |
| 3. Trade receivables, net: | | | | | | |
| a. Unaffiliated customers | 03 | | | | | |
| b. Affiliated customers | 04 | | | | | |
| 4. Inventories: | | | | | | |
| a. Raw materials and products | 05 | | | | | |
| b. Other materials and supplies | 06 | | | | | |
| 5. Other current assets | 07 | | | | | |
| 6. Total current assets | 08 | | | | | |
| B. Property, plant and equipment: | | | | | | |
| 1. Land | 09 | | | | | |
| 2. Buildings and improvements | 10 | | | | | |
| 3. Machinery and equipment | 11 | | | | | |
| 4. Transportation equipment | 12 | | | | | |
| 5. Pollution control facilities | 13 | | | | | |
| 6. Other fixed assets | 14 | | | | | |
| 7. Total smelter investment | 15 | | | | | |
| 8. Less: Accumulated depreciation and amortization | 16 | | | | | |

SCHEDULE A.4—HISTORICAL CAPITAL INVESTMENT SUMMARY—Continued

[Smelter identification]

| | Line | 1979 | 1980 | 1981 | 1982 | 1983 |
|---|---|---|---|---|---|---|
| 9. Net smelter investment | 17 | | | | | |
| C. Other noncurrent assets | 18 | | | | | |
| D. Total smelter capital investment | 19 | | | | | |
| E. Current liabilities: | | | | | | |
| 1. Trade accounts and notes payable: | | | | | | |
| a. Unaffiliated suppliers | 20 | | | | | |
| b. Affiliated suppliers | 21 | | | | | |
| 2. Other expense accruals | 22 | | | | | |
| 3. Notes payable, current | 23 | | | | | |
| 4. Other current liabilities | 24 | | | | | |
| 5. Total current liabilities | 25 | | | | | |
| F. Net smelter capital investment | 26 | | | | | |

SCHEDULE B—PRE-CONTROL REVENUE FORECAST

[Smelter identification]

| | Line | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 |
|---|---|---|---|---|---|---|---|---|
| A. Forecast smelter revenues—unaffiliated parties: | | | | | | | | |
| 1. Concentrates processed | 01 | | | | | | | |
| 2. Smelting charge | 02 | | | | | | | |
| 3. Total smelter revenues | 03 | | | | | | | |
| 4. Average product grade | 04 | | | | | | | |
| B. Forecast smelter revenues—affiliated parties: | | | | | | | | |
| 1. Concentrates processed | 05 | | | | | | | |
| 2. Smelting charge | 06 | | | | | | | |
| 3. Total smelter revenues | 07 | | | | | | | |
| 4. Average product grade | 08 | | | | | | | |
| C. Forecast co-product and by-product sales: | | | | | | | | |
| 1. Total co-product revenues | 09 | | | | | | | |
| 2. Total by-product revenues from: | | | | | | | | |
| a. Pollution control facilities | 10 | | | | | | | |
| b. Other smelter processing | 11 | | | | | | | |
| 3. Total co-product and by-product revenues | 12 | | | | | | | |

SCHEDULE B.2—PRE-CONTROL COST FORECAST

[Smelter identification]

| | Line | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 |
|---|---|---|---|---|---|---|---|---|
| A. Forecast production labor cost: | | | | | | | | |
| 1. Direct labor hours | 01 | | | | | | | |
| 2. Average hourly wage rate | 02 | | | | | | | |
| 3. Total wage payments | 03 | | | | | | | |
| 4. Supplemental employee benefits | 04 | | | | | | | |
| 5. Total production labor cost | 05 | | | | | | | |
| B. Forecast energy costs: | | | | | | | | |
| 1. Electricity: | | | | | | | | |
| a. Quantity in kilowatt hours | 06 | | | | | | | |
| b. Price per kwh | 07 | | | | | | | |
| c. Total electricity payments | 08 | | | | | | | |
| 2. Natural gas: | | | | | | | | |
| a. Quantity in mcf | 09 | | | | | | | |
| b. Price per mcf | 10 | | | | | | | |
| c. Total natural gas payments | 11 | | | | | | | |
| 3. Coal: | | | | | | | | |
| a. Quantity in tons | 12 | | | | | | | |
| b. Price per ton | 13 | | | | | | | |
| c. Total coal payments | 14 | | | | | | | |
| 4. Fuel oil: | | | | | | | | |
| a. Quantity in gallons | 15 | | | | | | | |
| b. Price per gallon | 16 | | | | | | | |
| c. Total fuel oil payments | 17 | | | | | | | |
| 5. Other (specify): | | | | | | | | |
| a. Quantity (specific units) | 18 | | | | | | | |
| b. Price per unit | 19 | | | | | | | |
| c. Total payments | 20 | | | | | | | |

SCHEDULE B.2—PRE-CONTROL COST FORECAST—Continued

[Smelter identification]

| | Line | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 |
|---|---|---|---|---|---|---|---|---|
| 6. Total energy costs | 21 | | | | | | | |

SCHEDULE B.3—PRE-CONTROL FORECAST PROFIT AND LOSS SUMMARY

[Smelter identification]

| | Line | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 |
|---|---|---|---|---|---|---|---|---|
| A. Forecast operating revenues: | | | | | | | | |
| 1. Smelter revenues—unaffiliated parties | 01 | | | | | | | |
| 2. Smelter revenues—affiliated parties | 02 | | | | | | | |
| 3. Co-product and by-product sales | 03 | | | | | | | |
| 4. Other operating revenues | 04 | | | | | | | |
| 5. Total operating revenues | 05 | | | | | | | |
| B. Forecast cost of sales: | | | | | | | | |
| 1. Material costs | 06 | | | | | | | |
| 2. Production labor costs | 07 | | | | | | | |
| 3. Energy costs | 08 | | | | | | | |
| 4. Pollution control costs | 09 | | | | | | | |
| 5. Production overhead | 10 | | | | | | | |
| 6. Other production costs | 11 | | | | | | | |
| 7. Total cost of sales | 12 | | | | | | | |
| C. Forecast gross operating profit | 13 | | | | | | | |
| D. Forecast other operating expenses: | | | | | | | | |
| 1. Selling, general and administrative expenses | 14 | | | | | | | |
| 2. Taxes, other than income tax | 15 | | | | | | | |
| 3. Research costs | 16 | | | | | | | |
| 4. Depreciation and amortization: | | | | | | | | |
| a. Pollution control facilities | 17 | | | | | | | |
| b. Other smelter facilities | 18 | | | | | | | |
| 5. Interest | 19 | | | | | | | |
| 6. Miscellaneous operating expenses | 20 | | | | | | | |
| 7. Total other operating expenses | 21 | | | | | | | |
| E. Forecast income from operations | 22 | | | | | | | |

SCHEDULE B.4—CONSTANT CONTROLS REVENUE FORECAST

[Smelter identification]

| | Line | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 |
|---|---|---|---|---|---|---|---|---|
| A. Forecast smelter revenues—unaffiliated parties: | | | | | | | | |
| 1. Concentrates processed | 01 | | | | | | | |
| 2. Smelting charge | 02 | | | | | | | |
| 3. Total smelter revenues | 03 | | | | | | | |
| 4. Average product grade | 04 | | | | | | | |
| B. Forecast smelter revenues—affiliated parties: | | | | | | | | |
| 1. Concentrates processed | 05 | | | | | | | |
| 2. Smelting charge | 06 | | | | | | | |
| 3. Total smelter revenues | 07 | | | | | | | |
| 4. Average product grade | 08 | | | | | | | |
| C. Forecast co-product and by-product sales: | | | | | | | | |
| 1. Total co-product revenues | 09 | | | | | | | |
| 2. Total by-product revenues from: | | | | | | | | |
| a. Pollution control facilities | 10 | | | | | | | |
| b. Other smelter processing | 11 | | | | | | | |
| 3. Total co-product and by-product revenues | 12 | | | | | | | |

SCHEDULE B.5—CONSTANT CONTROLS COST FORECAST

[Smelter identification]

| | Line | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 |
|---|---|---|---|---|---|---|---|---|
| A. Forecast production labor cost: | | | | | | | | |
| 1. Direct labor hours | 01 | | | | | | | |

SCHEDULE B.5—CONSTANT CONTROLS COST FORECAST—Continued

[Smelter identification]

| | Line | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 |
|---|---|---|---|---|---|---|---|---|
| 2. Average hourly wage rate | 02 | | | | | | | |
| 3. Total wage payments | 03 | | | | | | | |
| 4. Supplemental employee benefits | 04 | | | | | | | |
| 5. Total production labor cost | 05 | | | | | | | |
| B. Forecast energy costs: | | | | | | | | |
| 1. Electricity: | | | | | | | | |
| a. Quantity in kilowatt hours | 06 | | | | | | | |
| b. Price per kwh | 07 | | | | | | | |
| c. Total electricity payments | 08 | | | | | | | |
| 2. Natural gas: | | | | | | | | |
| a. Quantity in mcf | 09 | | | | | | | |
| b. Price per mcf | 10 | | | | | | | |
| c. Total natural gas payments | 11 | | | | | | | |
| 3. Coal: | | | | | | | | |
| a. Quantity in tons | 12 | | | | | | | |
| b. Price per ton | 13 | | | | | | | |
| c. Total coal payments | 14 | | | | | | | |
| 4. Fuel oil: | | | | | | | | |
| a. Quantity in gallons | 15 | | | | | | | |
| b. Price per gallon | 16 | | | | | | | |
| c. Total fuel oil payments | 17 | | | | | | | |
| 5. Other (specify): | | | | | | | | |
| a. Quantity (specific units) | 18 | | | | | | | |
| b. Price per unit | 19 | | | | | | | |
| c. Total payments | 20 | | | | | | | |
| 6. Total energy costs | 21 | | | | | | | |

SCHEDULE B.6—CONSTANT CONTROLS PROFIT AND LOSS SUMMARY FOR THE PROFIT PROTECTION TEST

[Smelter identification]

| | Line | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 |
|---|---|---|---|---|---|---|---|---|
| A. Forecast operating revenues: | | | | | | | | |
| 1. Smelter revenues—unaffiliated parties | 01 | | | | | | | |
| 2. Smelter revenues—affiliated parties | 02 | | | | | | | |
| 3. Co-product and by-product sales | 03 | | | | | | | |
| 4. Other operating revenues | 04 | | | | | | | |
| 5. Total operating revenues | 05 | | | | | | | |
| B. Forecast cost of sales: | | | | | | | | |
| 1. Material costs | 06 | | | | | | | |
| 2. Production labor costs | 07 | | | | | | | |
| 3. Energy costs | 08 | | | | | | | |
| 4. Pollution control costs | 09 | | | | | | | |
| 5. Production overhead | 10 | | | | | | | |
| 6. Other production costs | 11 | | | | | | | |
| 7. Total cost of sales | 12 | | | | | | | |
| C. Forecast gross operating profit | 13 | | | | | | | |
| D. Forecast other operating expenses: | | | | | | | | |
| 1. Selling, general and administrative expenses | 14 | | | | | | | |
| 2. Taxes, other than income tax | 15 | | | | | | | |
| 3. Research costs | 16 | | | | | | | |
| 4. Depreciation and amortization: | | | | | | | | |
| a. Pollution control facilities | 17 | | | | | | | |
| b. Other smelter facilities | 18 | | | | | | | |
| 5. Interest | 19 | | | | | | | |
| 6. Miscellaneous operating expenses | 20 | | | | | | | |
| 7. Total other operating expenses | 21 | | | | | | | |
| E. Forecast income from operations | 22 | | | | | | | |

SCHEDULE B.7—PROFIT PROTECTION TEST

[Smelter identification]

| | Line | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | Total |
|---|---|---|---|---|---|---|---|---|---|
| A. Pre-control case: | | | | | | | | | |
| 1. Net income from operations | 01 | | | | | | | | XXXX |

SCHEDULE B.7—PROFIT PROTECTION TEST—Continued

[Smelter identification]

| | Line | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | Total |
|---|---|---|---|---|---|---|---|---|---|
| 2. Discount factors | 02 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | XXXX |
| 3. Present value of future net income | 03 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | XXXX |
| 4. Horizon value | 04 | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | ..... |
| 5. Discount factor | 05 | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | ..... |
| 6. Present value of horizon value | 06 | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | ..... |
| 7. Present value of future net income | 07 | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | ..... |
| 8. Total present value | 08 | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | ..... |
| B. Constant controls case: | | | | | | | | | |
| 1. Net income from operations | 09 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | XXXX |
| 2. Discount factors | 10 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | XXXX |
| 3. Present value of future net income | 11 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | XXXX |
| 4. Horizon value | 12 | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | ..... |
| 5. Discount factor | 13 | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | ..... |
| 6. Present value of horizon value | 14 | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | ..... |
| 7. Present value of future net income | 15 | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | ..... |
| 8. Total present value | 16 | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | ..... |
| C. Ratio of total present value of constant controls case to total, present value of base case | 17 | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | ..... |

SCHEDULE C.1—CONSTANT CONTROLS PROFIT AND LOSS SUMMARY FOR THE RATE OF RETURN TEST

[Smelter identification]

| | Line | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 |
|---|---|---|---|---|---|---|---|---|
| A. Forecast operating revenues: | | | | | | | | |
| 1. Smelter revenues—unaffilated parties | 01 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 2. Smelter revenues—affiliated parties | 02 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 3. Co-product and by-product sales | 03 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 4. Other operating revenues | 04 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 5. Total operating revenues | 05 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| B. Forecast cost of sales: | | | | | | | | |
| 1. Material costs | 06 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 2. Production labor costs | 07 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 3. Energy costs | 08 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 4. Pollution control costs | 09 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 5. Production overhead | 10 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 6. Other production costs | 11 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 7. Total cost of sales | 12 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| C. Forecast gross operating profit | 13 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| D. Forecast other operating expenses: | | | | | | | | |
| 1. Selling, general and administrative expenses | 14 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 2. Taxes, other than income tax | 15 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 3. Research costs | 16 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 4. Depreciation and amortization | | | | | | | | |
| a. Pollution control facilities | 17 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| b. Other smelter facilities | 18 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 5. Interest on short-term debt | 19 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 6. Miscellaneous operating expenses | 20 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 7. Total other operating expenses | 21 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| E. Forecast income from operations | 22 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| F. Forecast income taxes | 23 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| G. Forecast net income from operations | 24 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

SCHEDULE C.2—CONSTANT CONTROLS SUSTAINING CAPITAL INVESTMENT FORECAST

[Smelter identification]

| Sustaining capital | Line | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 |
|---|---|---|---|---|---|---|---|---|
| 1. Land | 01 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

SCHEDULE C.2—CONSTANT CONTROLS SUSTAINING CAPITAL INVESTMENT FORECAST—Continued

[Smelter identification]

| Sustaining capital | Line | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 |
|---|---|---|---|---|---|---|---|---|
| 2. Buildings and improvements | 02 | | | | | | | |
| 2. Machinery and equipment | 03 | | | | | | | |
| 4. Transportation equipment | 04 | | | | | | | |
| 5. Pollution control facilities | 05 | | | | | | | |
| 6. Other fixed assets | 06 | | | | | | | |
| 7. Total smelter sustaining capital | 07 | | | | | | | |

SCHEDULE C.3—HISTORICAL CAPITAL INVESTMENT IN CONSTANT DOLLARS

[Smelter identification]

| Items from 1983 balance sheet | Line | Nominal dollars | Constant dollars |
|---|---|---|---|
| A. Current assets: | | | |
| 1. Cash on hand and deposit | 01 | | |
| 2. Temporary cash investments | 02 | | |
| 3. Trade receivables, net: | | | |
| a. Unaffiliated customers | 03 | | |
| b. Affiliated customers | 04 | | |
| 4. Inventories: | | | |
| a. Raw materials and products | 05 | | |
| b. Other materials and supplies | 06 | | |
| 5. Other current assets | 07 | | |
| 6. Total current assets | 08 | | |
| B. Property, plant and equipment: | | | |
| 1. Land | 09 | | |
| 2. Buildings and improvements | 10 | | |
| 3. Machinery and equipment | 11 | | |
| 4. Transportation equipment | 12 | | |
| 5. Pollution control facilities | 13 | | |
| 6. Other fixed assets | 14 | | |
| 7. Total smelter investments | 15 | | |
| 8. Less: Accumulated depreciation and amortization | 16 | | |
| 9. Net smelter investment | 17 | | |
| C. Other noncurrent assets | 18 | | |
| D. Total smelter capital investment | 19 | | |
| E. Current liabilities: | | | |
| 1. Trade accounts and notes payable: | | | |
| a. Unaffiliated suppliers | 20 | | |
| b. Affiliated suppliers | 21 | | |
| 2. Other expense accruals | 22 | | |
| 3. Notes payable, current | 23 | | |
| 4. Other current liabilities | 24 | | |
| 5. Total current liabilities | 25 | | |
| F. Net smelter capital investment | 26 | | |

SCHEDULE C.4—RATE OF RETURN TEST

[Smelter identification]

| | Line | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | Total |
|---|---|---|---|---|---|---|---|---|---|
| A. Operating cash flow projection: | | | | | | | | | |
| 1. Net income from operations | 01 | | | | | | | | XXXX |
| 2. Depreciation and amortization: | | | | | | | | | |
| a. Pollution control facilities | 02 | | | | | | | | XXXX |
| b. Other smelter facilities | 03 | | | | | | | | XXXX |
| 3. Operating cash flow | 04 | | | | | | | | XXXX |
| 4. Capital expenditure projections: | | | | | | | | | |
| a. Constant controls | 05 | | | | | | | | XXXX |
| b. Sustaining capital | 06 | | | | | | | | XXXX |
| c. Total | 07 | | | | | | | | XXXX |
| 5. Net cash flow projections | 08 | | | | | | | | XXXX |
| 6. Discount factors | 09 | | | | | | | | XXXX |
| 7. Present value of future cash flows | 10 | | | | | | | | XXXX |

SCHEDULE C.4—RATE OF RETURN TEST—Continued

[Smelter identification]

| | Line | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | Total |
|---|---|---|---|---|---|---|---|---|---|
| B. Net present value: | | | | | | | | | |
| 1. Horizon value | 11 | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | ..... |
| 2. Discount factor | 12 | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | ..... |
| 3. Present value of horizon value | 13 | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | ..... |
| 4. Present value of future cash flows | 14 | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | ..... |
| 5. Total present value | 15 | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | ..... |
| 6. Net smelter capital investment in constant dollars | 16 | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | ..... |
| 7. Net present value | 17 | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | ..... |

SCHEDULE C.5—HORIZON VALUE OF CASH FLOWS

[Smelter identification]

| | Line | Final forecast years | | Horizon years | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | Total |
| A. Depreciation-free horizon value: | | | | | | | | | |
| 1. Net cash flow projections | 01 | ..... | ..... | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX |
| 2. Depreciation tax savings: | | | | | | | | | |
| a. Depreciation and amortization | 02 | ..... | ..... | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX |
| b. Marginal tax rate | 03 | ..... | ..... | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX |
| c. Tax savings | 04 | ..... | ..... | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX |
| 3. Depreciation-free net cash flows: | | | | | | | | | |
| a. Nominal dollar values | 05 | ..... | ..... | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX |
| b. 1990 dollar values | 06 | ..... | ..... | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX |
| c. Average | 07 | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | ..... |
| 4. Horizon factor | 08 | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | ..... |
| 5. Depreciation-free horizon value | 09 | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | ..... |
| B. Depreciation tax savings over the horizon period: | | | | | | | | | |
| 1. Depreciation and amortization | 10 | XXXX | XXXX | ..... | ..... | ..... | ..... | ..... | XXXX |
| 2. Marginal tax rate | 11 | XXXX | XXXX | ..... | ..... | ..... | ..... | ..... | XXXX |
| 3. Tax savings | 12 | XXXX | XXXX | ..... | ..... | ..... | ..... | ..... | XXXX |
| 4. Discount factors | 13 | XXXX | XXXX | ..... | ..... | ..... | ..... | ..... | XXXX |
| 5. Present value of tax savings | 14 | XXXX | XXXX | ..... | ..... | ..... | ..... | ..... | XXXX |
| 6. Total present value of tax savings | 15 | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | ..... |
| C. Horizon Value | 16 | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | ..... |

SCHEDULE D.1—INTERIM CONTROLS REVENUE FORECAST

[Smelter Identification]

| | Line | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 |
|---|---|---|---|---|---|---|---|---|
| A. Forecast smelter revenues—unaffiliated parties: | | | | | | | | |
| 1. Concentrates processed | 01 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 2. Smelting charge | 02 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 3. Total smelter revenues | 03 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 4. Average product grade | 04 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| B. Forecast smelter revenues—affiliated parties: | | | | | | | | |
| 1. Concentrates processed | 05 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 2. Smelting charge | 06 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 3. Total smelter revenues | 07 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 4. Average product grade | 08 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| C. Forecast co-product and by-product sales: | | | | | | | | |
| 1. Total co-product revenues | 09 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 2. Total by-product revenues from: | | | | | | | | |
| a. Pollution control facilities | 10 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

SCHEDULE D.1—INTERIM CONTROLS REVENUE FORECAST—Continued

[Smelter Identification]

| | Line | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 |
|---|---|---|---|---|---|---|---|---|
| b. Other smelter processing | 11 | | | | | | | |
| 3. Total co-product and by-product revenues: | 12 | | | | | | | |

SCHEDULE D.2—INTERIM CONTROLS COST FORECAST

[Smelter Identification]

| | Line | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 |
|---|---|---|---|---|---|---|---|---|
| A. Forecast production labor cost: | | | | | | | | |
| 1. Direct labor hours | 01 | | | | | | | |
| 2. Average hourly wage rate | 02 | | | | | | | |
| 3. Total wage payments | 03 | | | | | | | |
| 4. Supplemental employee benefits | 04 | | | | | | | |
| 5. Total production labor cost | 05 | | | | | | | |
| B. Forecast energy costs: | | | | | | | | |
| 1. Electricity: | | | | | | | | |
| a. Quantity in kilowatt hours | 06 | | | | | | | |
| b. Price per kwh | 07 | | | | | | | |
| c. Total electricity payments | 08 | | | | | | | |
| 2. Natural gas: | | | | | | | | |
| a. Quantity in mcf | 09 | | | | | | | |
| b. Price per mcf | 10 | | | | | | | |
| c. Total natural gas payments | 11 | | | | | | | |
| 3. Coal: | | | | | | | | |
| a. Quantity in tons | 12 | | | | | | | |
| b. Price per ton | 13 | | | | | | | |
| c. Total coal payments | 14 | | | | | | | |
| 4. Fuel oil: | | | | | | | | |
| a. Quantity in gallons | 15 | | | | | | | |
| b. Price per gallon | 16 | | | | | | | |
| c. Total fuel oil payments | 17 | | | | | | | |
| 5. Other (specify): | | | | | | | | |
| a. Quantity (specific units) | 18 | | | | | | | |
| b. Price per unit | 18 | | | | | | | |
| c. Total payments | 20 | | | | | | | |
| 6. Total energy costs | 21 | | | | | | | |

SCHEDULE D.3—INTERIM CONTROLS FORECAST PROFIT AND LOSS SUMMARY

[Smelter identification]

| | Line | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 |
|---|---|---|---|---|---|---|---|---|
| A. Forecast operating revenues: | | | | | | | | |
| 1. Smelter revenues—unaffiliated parties | 01 | | | | | | | |
| 2. Smelter revenues—affiliated parties | 02 | | | | | | | |
| 3. Co-product and by-product sales | 03 | | | | | | | |
| 4. Other operating revenues | 04 | | | | | | | |
| 5. Total operating revenues | 05 | | | | | | | |
| B. Forecast cost of sales: | | | | | | | | |
| 1. Material costs | 06 | | | | | | | |
| 2. Production labor costs | 07 | | | | | | | |
| 3. Energy costs | 08 | | | | | | | |
| 4. Pollution control costs | 09 | | | | | | | |
| 5. Production overhead | 10 | | | | | | | |
| 6. Other production costs | 11 | | | | | | | |
| 7. Total cost of sales | 12 | | | | | | | |
| C. Forecast gross operating profit | 13 | | | | | | | |
| D. Forecast other operating expenses: | | | | | | | | |
| 1. Selling, general and administrative expenses | 14 | | | | | | | |
| 2. Taxes, other than income tax | 15 | | | | | | | |
| 3. Research costs | 16 | | | | | | | |
| 4. Depreciation and amortization: | | | | | | | | |
| a. Pollution control facilities | 17 | | | | | | | |
| b. Other smelter facilities | 18 | | | | | | | |
| 5. Interest on short-term debt | 19 | | | | | | | |
| 6. Miscellaneous operating expenses | 20 | | | | | | | |

SCHEDULE D.3—INTERIM CONTROLS FORECAST PROFIT AND LOSS SUMMARY—Continued

[Smelter identification]

| | Line | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 |
|---|---|---|---|---|---|---|---|---|
| 7. Total other operating expenses | 21 | | | | | | | |
| E. Forecast income from operations | 22 | | | | | | | |
| F. Forecast income taxes | 23 | | | | | | | |
| G. Forecast net income from operations | 24 | | | | | | | |

SCHEDULE D.4—INTERIM CONTROL SUSTAINING CAPITAL INVESTMENT FORECAST

[Smelter identification]

| Sustaining capital | Line | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 |
|---|---|---|---|---|---|---|---|---|
| 1. Land | 01 | | | | | | | |
| 2. Buildings and improvements | 02 | | | | | | | |
| 3. Machinery and equipment | 03 | | | | | | | |
| 4. Transportation equipment | 04 | | | | | | | |
| 5. Pollution control facilities | 05 | | | | | | | |
| 6. Other fixed assets | 06 | | | | | | | |
| 7. Total smelter sustaining capital | 07 | | | | | | | |

SCHEDULE D.5—CASH PROCEEDS FROM LIQUIDATION

[Smelter identification]

| | Line | (1) Estimated Liquidation value | (2) Reported net book value | (3) Total gain (loss) | Gain (loss) subject to taxation as— | |
|---|---|---|---|---|---|---|
| | | | | | (4) Ordinary income | (5) Capital gain |
| A. Total current assets | 01 | | | XXXXX | XXXXX | XXXXX |
| B. Property, plant and equipment: | | | | | | |
| 1. Land | 02 | | | | | |
| 2. Buildings and improvements | 03 | | | | | |
| 3. Machinery and equipment | 04 | | | | | |
| 4. Transportation equipment | 05 | | | | | |
| 5. Pollution control facilities | 06 | | | | | |
| 6. Other fixed assets | 07 | | | | | |
| 7. Total | 08 | | | | | |
| C. Other noncurrent assets. | 09 | | | | | |
| D. Total smelter value | 10 | | | | | |
| E. Total current liabilities | 11 | | | XXXXX | XXXXX | XXXXX |
| F. Gross liquidation value | 12 | | | | | |
| G. Liquidation costs | 13 | | XXXXX | | | XXXXX |
| H. Net Taxable Gain (or loss) | 14 | XXXXX | XXXXX | XXXXX | | |
| I. Income tax rate | 15 | XXXXX | XXXXX | XXXXX | | |
| J. Income tax on gain (loss) | 16 | XXXXX | XXXXX | XXXXX | | |
| K. After tax cash proceeds from liquidation | 17 | | XXXXX | XXXXX | XXXXX | XXXXX |

SCHEDULE D.6—PERMANENT WAIVER FROM INTERIM CONTROLS TEST

[Smelter identification]

| | Line | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | Total |
|---|---|---|---|---|---|---|---|---|---|
| A. Operating Cash flow projection: | | | | | | | | | |
| 1. Net income from operations | 01 | | | | | | | | XXXX |
| 2. Net income adjustments | 02 | | | | | | | | XXXX |
| 3. Depreciation and amortization: | | | | | | | | | |
| a. Pollution control facilities | 03 | | | | | | | | XXXX |
| b. Other smelter facilities | 04 | | | | | | | | XXXX |
| 4. Operating cash flow | 05 | | | | | | | | XXXX |
| 5. Capital expenditure projections: | | | | | | | | | |
| a. Interim controls | 06 | | | | | | | | XXXX |
| b. Sustaining capital | 07 | | | | | | | | XXXX |
| c. Total | 08 | | | | | | | | XXXX |
| 6. Net cash flow projections | 09 | | | | | | | | XXXX |

SCHEDULE D.6—PERMANENT WAIVER FROM INTERIM CONTROLS TEST—Continued

[Smelter identification]

| | Line | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | Total |
|---|---|---|---|---|---|---|---|---|---|
| 7. Discount factors | 10 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | XXXX |
| 8. Present value of future cash flows | 11 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | XXXX |
| B. Net present value: | | | | | | | | | |
| 1. Horizon value | 12 | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | ..... |
| 2. Discount factor | 13 | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | ..... |
| 3. Present value of horizon value | 14 | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | ..... |
| 4. Present value of future cash flows | 15 | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | ..... |
| 5. Total present value | 16 | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | ..... |
| 6. Current salvage value | 17 | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | ..... |
| 7. Net present value | 18 | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | ..... |

SCHEDULE D.7—HORIZON VALUE OF CASH FLOWS

[Smelter identification]

| | Line | Final forecast years | | Horizon years | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|
| | | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | |
| A. Depreciation-free horizon value: | | | | | | | | | |
| 1. Net cash flow projections | 01 | ..... | ..... | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX |
| 2. Depreciation tax savings: | | | | | | | | | |
| a. Depreciation and amortization | 02 | ..... | ..... | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX |
| b. Marginal tax rate | 03 | ..... | ..... | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX |
| c. Tax savings | 04 | ..... | ..... | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX |
| 3. Depreciation-free net cash flows: | | | | | | | | | |
| a. Nominal dollar values | 05 | ..... | ..... | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX |
| b. 1990 dollar values | 06 | ..... | ..... | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX |
| c. Average | 07 | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | ..... |
| 4. Horizon factor | 08 | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | ..... |
| 5. Depreciation-free horizon value | 09 | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | ..... |
| B. Depreciation tax savings over the horizon period: | | | | | | | | | |
| 1. Depreciation and amortization | 10 | XXXX | XXXX | ..... | ..... | ..... | ..... | ..... | XXXX |
| 2. Marginal tax rate | 11 | XXXX | XXXX | ..... | ..... | ..... | ..... | ..... | XXXX |
| 3. Tax savings | 12 | XXXX | XXXX | ..... | ..... | ..... | ..... | ..... | XXXX |
| 4. Discount factors | 13 | XXXX | XXXX | ..... | ..... | ..... | ..... | ..... | XXXX |
| 5. Present value of tax savings | 14 | XXXX | XXXX | ..... | ..... | ..... | ..... | ..... | XXXX |
| 6. Total present value of tax savings | 15 | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | ..... |
| C. Horizon Value | 16 | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | XXXX | ..... |

# PART 58—AMBIENT AIR QUALITY SURVEILLANCE

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APPENDIX G TO PART 58—UNIFORM AIR QUALITY INDEX (AQI) AND DAILY REPORTING

AUTHORITY: 42 U.S.C. 7403, 7410, 7601(a), 7611, and 7619.

SOURCE: 44 FR 27571, May 10, 1979; 59 FR 41628, Aug. 12, 1994, unless otherwise noted.

## Subpart A—General Provisions

SOURCE: 71 FR 61296, Oct. 17, 2006, unless otherwise noted.

### § 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 Statistical Areas (MSAs) and micropolitan statistical areas are the two categories of CBSA (metropolitan areas have populations greater than 50,000; and micropolitan areas have populations between 10,000 and 50,000). In the case of very large cities where two or more CBSAs are combined, these larger areas are referred to as combined statistical areas (CSAs) (*http://www.census.gov/population/estimates/metro-city/List1.txt*).

*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.

*Federal equivalent method (FEM)* 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 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.

*Federal reference method (FRM)* 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.

$HNO_3$ 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/or precipitation.

*Metropolitan Statistical Area (MSA)* means a CBSA associated with at least one urbanized area of 50,000 population or greater. 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. MPAs are generally oriented toward CBSAs or CSAs with populations greater than 200,000, but for convenience, those portions of a State that are not associated with CBSAs 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 $PM_{2.5}$, $PM_{10-2.5}$), $O_3$, $SO_2$, CO, nitrogen oxides ($NO/NO_2/NO_y$), Pb, 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 an implementation plan approved or promulgated pursuant to section 110 of the Act.

*PM* means $PM_{10}$, $PM1_{10C}$, $PM_{2.5}$, $PM_{10-2.5}$, or particulate matter of unspecified size range.

*$PM_{2.5}$* 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.

*$PM_{10-2.5}$* 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 monitor 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.

*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

SOURCE: 71 FR 61298, Oct. 17, 2006, unless otherwise noted.

### § 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 SLAMS monitoring stations including FRM, FEM, and 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, and SPM monitoring stations. The plan shall include a statement of purposes 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. If the State or local agency has already provided a public comment opportunity on its plan and has made no changes subsequent to that comment opportunity, the Regional Administrator is not required to provide a separate opportunity for comment.

(3) The plan for establishing required NCore multipollutant stations shall be submitted to the Administrator not later than 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 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 as described in §58.30.

(8) The MSA, CBSA, CSA or other area represented by the monitor.

(c) 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 obtaining public comment and include any comments received through the public notification process within their submitted plan.

(d) 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. The network assessment 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. 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, 2010.

(e) All proposed additions and discontinuations of SLAMS monitors in annual monitoring network plans and periodic network assessments are subject to approval according to §58.14.

EFFECTIVE DATE NOTE: At 72 FR 32210, June 12, 2007, §58.10 was amended by revising the second sentence in paragraph (a)(2), effective Sept. 10, 2007. For the convenience of the user, the revised text is set forth as follows:

**§58.10 Annual monitoring network plan and periodic network assessment.**

(a)(1) * * *

(2) * * * If the State or local agency has already provided a public comment opportunity on its plan and has made no changes subsequent to that comment opportunity, and has submitted the received comments together with the plan, the Regional Administrator is not required to provide a separate opportunity for comment.

* * * * *

**§58.11 Network technical requirements.**

(a)(1) State and local governments shall follow the applicable quality assurance criteria contained in appendix A to this part when operating the SLAMS networks.

(2) Beginning January 1, 2009, State and local governments shall follow the quality assurance criteria contained in appendix A to this part that apply to SPM sites when operating any SPM site which uses a FRM, FEM, or ARM and meets the requirements of appendix E to this part, unless the Regional Administrator approves an alternative to the requirements of appendix A with respect to such SPM sites because meeting those requirements would be physically and/or financially impractical due to physical conditions at the monitoring site and the requirements are not essential to achieving the intended data objectives of the SPM site. Alternatives to the requirements of appendix A may be approved for an SPM site as part of the approval of the annual monitoring plan, or separately.

(3) 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.

**§ 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 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 SLAMS stations other than NCore 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 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 factors, including but not limited to 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 plus or minus 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. Sites that have a design value within plus or minus 5 percent of the daily $PM_{2.5}$ NAAQS must have an FRM or FEM operate on a daily schedule.

(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) For $PM_{10}$ samplers'a 24-hour sample must be taken from midnight to midnight (local time) to ensure national consistency. The minimum monitoring schedule for the site in the area of expected maximum concentration shall be based on the relative level of that monitoring site concentration with respect to the 24-hour standard as illustrated in Figure 1. If the operating agency demonstrates by monitoring data that during certain periods of the year conditions preclude violation of the $PM_{10}$ 24-hour standard, the increased sampling frequency for those periods or seasons may be exempted by the Regional Administrator and permitted to revert back to once in six days. The minimum sampling schedule for all other sites in the area remains once every six days. No less frequently than as part of each 5-year network assessment, the most recent year of data must be considered to estimate the air quality status at the site near the area of maximum concentration. Statistical

models such as analysis of concentration frequency distributions as described in ''Guideline for the Interpretation of Ozone Air Quality Standards,'' EPA–450/479–003, U.S. Environmental Protection Agency, Research Triangle Park, NC, January 1979, should be used. Adjustments to the monitoring schedule must be made on the basis of the 5-year network assessment. The site having the highest concentration in the most current year must be given first consideration when selecting the site for the more frequent sampling schedule. Other factors such as major change in sources of $PM_{10}$ emissions or in sampling site characteristics could influence the location of the expected maximum concentration site. Also, the use of the most recent 3 years of data might, in some cases, be justified in order to provide a more representative database from which to estimate current air quality status and to provide stability to the network. This multiyear consideration reduces the possibility of an anomalous year biasing a site selected for accelerated sampling. If the maximum concentration site based on the most current year is not selected for the more frequent operating schedule, documentation of the justification for selection of an alternative site must be submitted to the Regional Office for approval during the 5-year network assessment process. Minimum data completeness criteria, number of years of data and sampling frequency for judging attainment of the NAAQS are discussed in appendix K of part 50 of this chapter.

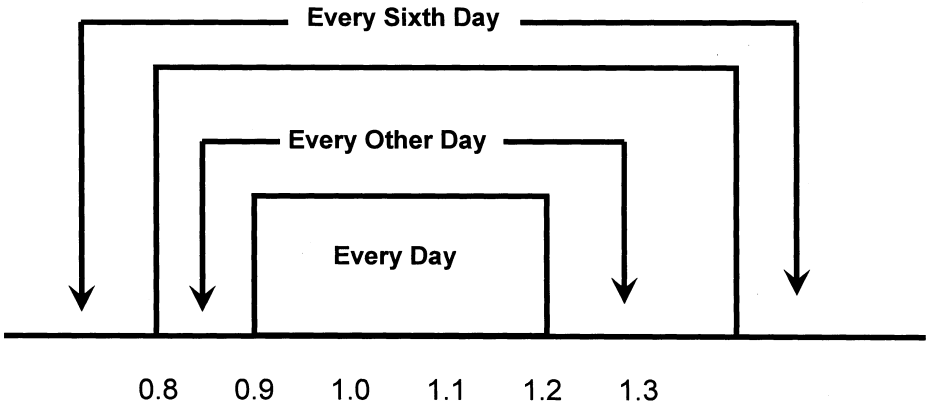


Figure 1 – Ratio to Standard

(f) For manual $PM_{10-2.5}$ samplers:

(1) Manual $PM_{10-2.5}$ samplers at NCore stations must operate on at least a 1-in-3 day schedule at sites without a collocated continuously operating federal equivalent $PM_{10-2.5}$ method that has been designated in accordance with part 53 of this chapter.

(2) Manual $PM_{10-2.5}$ speciation samplers at NCore stations must operate on at least a 1-in-3 day sampling frequency.

EFFECTIVE DATE NOTE: At 72 FR 32210, June 12, 2007, §58.12 was amended by revising paragraphs (d)(1), (d)(3), and the first sentence of paragraph (e), effective Sept. 10, 2007. For the convenience of the user, the revised text is set forth as follows:

**§58.12 Operating schedules.**

* * * * *

(d) * * *

(1)(i) Manual $PM_{2.5}$ samplers at required SLAMS stations without a collocated continuously operating $PM_{2.5}$ monitor must operate on at least a 1-in-3 day schedule.

(ii) For SLAMS $PM_{2.5}$ sites with both manual and continuous $PM_{2.5}$ monitors operating, the monitoring agency may request approval for a reduction to 1-in-6 day $PM_{2.5}$ sampling or for seasonal sampling from the EPA Regional Administrator. The EPA Regional Administrator may grant sampling frequency reductions after consideration of factors, including but not limited to the historical $PM_{2.5}$ data quality assessments, the location of current $PM_{2.5}$ design value sites, and their regulatory data needs. Required SLAMS stations whose measurements determine the design value for their area and that are within plus or minus 10 percent of the NAAQS; and all required sites where one or more 24-hour values have exceeded the NAAQS each year for a consecutive period of at least 3 years are required to maintain at least a 1-in-3 day sampling frequency. A continuously operating FEM or ARM $PM_{2.5}$ monitor satisfies this requirement.

(iii) Required SLAMS stations whose measurements determine the design value for their area and that are within plus or minus 5 percent of the daily $PM_{2.5}$ NAAQS must have an FRM or FEM operate on a daily schedule. A continuously operating FEM or ARM $PM_{2.5}$ monitor satisfies this requirement.

* * * * *

(3) Manual $PM_{2.5}$ speciation samplers at STN stations must operate on at least a 1-in-3 day sampling frequency.

(e) For $PM_{10}$ samplers, a 24-hour sample must be taken from midnight to midnight (local standard time) to ensure national consistency. * * *

EFFECTIVE DATE NOTE: At 72 FR 32210, June 12, 2007, § 58.12, Figure 1 of paragraph (e) was revised, effective Sept. 10, 2007. For the convenience of the user, the revised text is set forth as follows:

**§ 58.12 Operating schedules.**

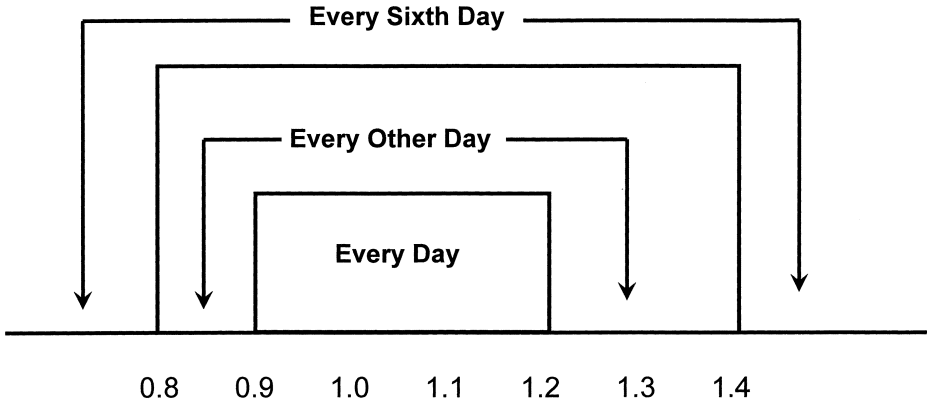


Figure 1 – Ratio to Standard

**§ 58.13 Monitoring network completion.**

(a) 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.

(b) Where existing networks are not in conformance with required numbers of monitors specified in this part, additional required monitors must be operated by January 1, 2008.

**§ 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 with respect to the SLAMS network are subject to the approval of the EPA Regional Administrator. Plans containing modifications to NCore Stations or PAMS Stations shall be submitted to the Administrator. The Regional Administrator shall provide opportunity for public comment and shall approve or disapprove submitted plans and schedules 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 SLAMS monitor station discontinuation, subject to the review of the Regional Administrator, will be approved if any of the following criteria are met and if the requirements of appendix D to this part, if any, continue to be 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 and if the requirements of appendix D to this part, if any, continue to be met.

(1) Any $PM_{2.5}$, $O_3$, CO, $PM_{10}$, $SO_2$, Pb, or $NO_2$ SLAMS 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. In a nonattainment or maintenance area, if the most recent attainment or maintenance plan adopted by the State and approved by EPA contains a contingency measure to be triggered by an air quality concentration and the monitor to be discontinued is the only SLAMS monitor operating in the nonattainment or maintenance area, the monitor may not be discontinued.

(2) Any SLAMS 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 (or portion of a county within a distinct attainment area, nonattainment area, or maintenance area, as applicable) 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, any SLAMS monitor in a county (or portion of a county within a distinct attainment, nonattainment, or maintenance area, as applicable) provided the monitor has not measured violations of the applicable NAAQS in the previous five years, 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 $PM_{2.5}$ SLAMS 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 SLAMS 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.

(6) A SLAMS monitor not eligible for removal under any of the criteria in paragraphs (c)(1) through (c)(5) of this section may 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.

### § 58.15 Annual air monitoring data certification.

(a) 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 FRM, FEM, and ARM SPM stations that meet criteria in appendix A to this part from January 1 to December 31 of the previous year. The senior air pollution control officer in each agency, or his or her 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.

(1) Through 2009, the annual data certification letter is due by July 1 of each year.

(2) Beginning in 2010, the annual data certification letter is due by May 1 of each year.

(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 collected at all SLAMS and at SPM stations using FRM, FEM, or ARMs. 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 must be submitted on the same schedule as the certification letter, 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.

(c) Along with each certification letter, the State shall submit to the Administrator (through the appropriate Regional Office) a summary of the precision and accuracy data for all ambient air quality data collected at all SLAMS and at SPM stations using FRM, FEM, or ARMs. The summary of precision and accuracy shall be submitted for data collected from January 1 to December 31 of the previous year. The summary of precision and accuracy must be submitted on the same schedule as the certification letter, unless an approved alternative date is included in the plan.

### § 58.16 Data submittal and archiving requirements.

(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; $NO_Y$; $NO_X$; Pb; $PM_{10}$ mass concentration; $PM_{2.5}$ mass concentration; for filter-based $PM_{2.5}$ FRM/FEM the field blank mass, sampler-generated average daily temperature, and sampler-generated average daily pressure; chemically speciated $PM_{2.5}$ mass concentration data; $PM_{10-2.5}$ mass concentration; chemically speciated $PM_{10-2.5}$ mass concentration 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.

(f) The State, or where applicable, local agency shall archive all $PM_{2.5}$, $PM_{10}$, and $PM_{10-2.5}$ filters from manual low-volume samplers (samplers having flow rates less than 200 liters/minute) from all SLAMS sites for a minimum period of 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 particulate matter 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. The 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.

## Subpart C—Special Purpose Monitors

SOURCE: 71 FR 61302, Oct. 17, 2006, unless otherwise noted.

### § 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 purposes for each SPM monitor and evidence that operation of each monitor meets the requirements of appendix A or an approved alternative as provided by § 58.11(a)(2) where applicable. The monitoring agency may designate a monitor as an SPM after January 1, 2007 only if it is a new monitor, i.e., a SLAMS monitor that is not included in the currently applicable monitoring plan or, for a monitor included in the monitoring plan prior to January 1, 2007, if the Regional Administrator has approved the discontinuation of the monitor as a SLAMS site.

(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 appendix A to this part or an approved alternative to appendix A 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 using a FRM, FEM, or ARM meeting the requirements of appendix A must be submitted to AQS according to the requirements of § 58.16. Data collected by other SPMs may be submitted. The monitoring agency must also submit to AQS an indication of whether each SPM reporting data to AQS monitor meets the requirements of appendices A and 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 that the data came from a particular period during which the requirements of appendix A or an

approved alternative, appendix C, or appendix E were not met in practice.

(d) If an SPM using an FRM, FEM, or ARM is discontinued within 24 months of start-up, the Administrator will not base a NAAQS violation determination for the $PM_{2.5}$ or ozone NAAQS solely on data from the SPM.

(e) If an SPM using an FRM, FEM, or ARM is discontinued within 24 months of start-up, the Administrator will not designate an area as nonattainment for the CO, $SO_2$, $NO_2$, Pb, or 24-hour $PM_{10}$ NAAQS solely on the basis of data from the SPM. 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.

EFFECTIVE DATE NOTE: At 72 FR 32210, June 12, 2007, § 58.20(c) was revised, effective Sept. 10, 2007. For the convenience of the user, the revised text is set forth as follows:

**§ 58.20 Special purpose monitors (SPM).**

* * * * *

(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 that the data came from a particular period during which the requirements of appendix A, appendix C, or appendix E to this part were not met in practice.

* * * * *

## Subpart D—National Air Monitoring Stations (NAMS)

SOURCE: 71 FR 61302, Oct. 17, 2006, unless otherwise noted.

**§ 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 to this part, 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) [Reserved]

## Subpart E [Reserved]

## Subpart F—Air Quality Index Reporting

**§ 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.

[71 FR 61302, Oct. 17, 2006]

## Subpart G—Federal Monitoring

SOURCE: 44 FR 27571, May 10, 1979, unless otherwise noted. Redesignated at 58 FR 8467, Feb. 12, 1993.

**§ 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 in § 58.10, a SLAMS station at a site which is necessary in the judgment of the Regional Administrator to meet the objectives defined in appendix D to this part.

[71 FR 61303, Oct. 17, 2006]

### § 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.

[71 FR 61303, Oct. 17, 2006]

## APPENDIX A TO PART 58—QUALITY ASSURANCE REQUIREMENTS FOR SLAMS, SPMS 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 for the pollutants $SO_2$, $NO_2$, $O_3$, CO, $PM_{2.5}$, $PM_{10}$ and $PM_{10-2.5}$ submitted to EPA. This appendix also applies to all SPM stations using FRM, FEM, or ARM methods which also meet the requirements of Appendix E of this part. 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, 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, SPMs if applicable, and PSD are the same. Affected SPMs are subject to all the SLAMS requirements, even where not specifically stated in each section. 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. The requirements of this appendix do not apply to a SPM that does not use a FRM, FEM, or ARM;

(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 annual performance evaluations (described in section 3.2.2 of this appendix) 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. 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), by primary quality assurance organization, or nationally, 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 of 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 objectives for which the data are collected. The process by which one determines the quality of data needed to meet the monitoring objective is sometimes referred to the Data Quality Objectives Process. 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 his or her representative. 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 his or her representative, may allow delegation of the authority to review and approve the 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 environmental data operation (EDO) to have a 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 organization's 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 plus or minus 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 the 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 NPAP 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 advertising 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 advertising.

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 primary quality assurance organizations (PQAOs) to perform the measurement quality checks that can be used to assess data quality. With the exception of the flow rate verifications (sections 3.2.3 and 3.3.2 of this appendix), data from these checks are required to be submitted to the AQS within the same time frame as routine ambient concentration 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. A primary quality assurance organization is defined as a monitoring organization or a coordinated aggregation of such organizations that is responsible for a set of stations that monitors the same pollutant and for which data quality assessments can logically 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 Data quality 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). 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 Annual 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. The evaluation should 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 audit levels. The audit levels selected should represent or bracket 80 percent of ambient concentrations measured by 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 level 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 Administrator'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, if the open path instrument is not installed in a permanent manner, the monitoring path length must be reverified to within plus or minus 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 $PM_{10}$, $PM_{10-2.5}$ 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 $PM_{10}$, $PM_{10-2.5}$ and $PM_{2.5}$ particulate analyzers. Where possible, EPA strongly encourages more frequent auditing. The audit should (preferably) 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 Sampling Procedures for $PM_{2.5}$. 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 0.5 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 model designated as an EPA FEM used by the PQAO, 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, FEM or ARM 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 about 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 Collocated Sampling Procedures for $PM_{10-2.5}$. For the $PM_{10-2.5}$ network, all automated methods must be designated as Federal equivalent methods (FEMs). 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.

3.2.6.1 The EPA shall ensure that each EPA designated FEM within the national $PM_{10-2.5}$ monitoring network must:

(a) Have 15 percent of the monitors collocated (values of 0.5 and greater round up); and

(b) Have at least 2 collocated monitors (if the total number of monitors is less than 10). The first collocated monitor must be a designated FRM monitor and the second must be a monitor of the same method designation. Both collocated FRM and FEM monitors can be located at the same site.

3.2.6.2 The Regional Administrator for the EPA Regions where the FEMs are implemented will select the sites for collocated monitoring. The site selection process shall consider giving priority to sites at primary quality assurance organizations or States with more than one $PM_{10-2.5}$ site, sites considered important from a regional perspective, and sites needed for an appropriate distribution among rural and urban NCore sites. Depending on the speed at which the $PM_{10-2.5}$ network is deployed, the first sites implementing FEMs shall be required to perform collocation until there is a larger distribution of FEM monitors implemented in the network.

3.2.6.3 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.

3.2.6.4 Sample the collocated audit monitor for SLAMS sites on a 12-day schedule. 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.

3.2.7 $PM_{2.5}$ Performance Evaluation Program (PEP) Procedures. The PEP 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 a 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.

3.2.8 $PM_{10-2.5}$ Performance Evaluation Program. For the $PM_{10-2.5}$ network, all automated methods will be designated as federal equivalent methods (FEMs). One performance evaluation audit, as described in section 3.2.7 must be performed at one $PM_{10-2.5}$ site in each primary quality assurance organization each year. The calculations for evaluating bias between the primary monitor(s) and the performance evaluation monitors for $PM_{10-2.5}$ 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 Sampling 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. However, $PM_{10}$ samplers used in the $PM_{10-2.5}$ network, may be counted along with the $PM_{10}$ samplers in the $PM_{10}$ network as long as the $PM_{10}$ samplers in both networks are the same method designation. $PM_{10}$ 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 approximately 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 $PM_{2.5}$, $PM_{10}$ (low-volume instruments), and $PM_{10-2.5}$. High-volume $PM_{10}$ and TSP instruments can also follow the procedure in section 3.2.3 but the audits are required to be conducted quarterly. 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 $PM_{2.5}$, $PM_{10}$, $PM_{10-2.5}$ 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 (¾ 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 ..... | 400–1,000 | 3.0–5.0 |

[1] Equivalent ambient Pb concentration in µ/m³ is based on sampling at 1.7 m³/min for 24 hours on a 20.3 cm × 25.4 cm (8 inch × 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 Sampling Procedures for $PM_{2.5}$. Follow the same procedure as described in section 3.2.5 of this appendix. $PM_{2.5}$ samplers used in the $PM_{10-2.5}$ network, may be counted along with the $PM_{2.5}$ samplers in the $PM_{2.5}$ network as long as the $PM_{2.5}$ samplers in both networks are the same method designation.

3.3.6 Collocated Sampling Procedures for $PM_{10-2.5}$. All designated FRMs within the $PM_{10-2.5}$ monitoring network must have 15

percent of the monitors collocated (values of 0.5 and greater round up) at the $PM_{10-2.5}$ sites. All FRM method designations can be aggregated.

3.3.6.1 The EPA shall ensure that each designated FEM within the $PM_{10-2.5}$ monitoring network must:

(a) Have 15 percent of the monitors collocated (values of 0.5 and greater round up); and

(b) Have at least 2 collocated monitors (if the total number of monitors is less than 10). The first collocated monitor must be a designated FRM monitor and the second must be a monitor of the same method designation. Both collocated FRM and FEM monitors can be located at the same site.

3.3.6.2 The Regional Administrator for the EPA Region where the FRM or FEMs are implemented will select the sites for collocated monitoring. The collocation site selection process shall consider sites at primary quality assurance organizations or States with more than one $PM_{10-2.5}$ site; primary quality assurance organizations already monitoring for $PM_{10}$ and $PM_{2.5}$ using FRMs or FEMs; and an appropriate distribution among rural and urban NCore sites. Monitoring organizations implementing $PM_{10}$ samplers and $PM_{2.5}$ FRM samplers of the same method designation as the $PM_{10-2.5}$ FRM can include the $PM_{10-2.5}$ monitors in their respective $PM_{10}$ and $PM_{2.5}$ count. Follow the same procedures as described in sections 3.2.6.2 and 3.2.6.3 of this appendix.

3.3.7 $PM_{2.5}$ Performance Evaluation Program (PEP) Procedures. Follow the same procedure as described in section 3.2.7 of this appendix.

3.3.8 $PM_{10-2.5}$ Performance Evaluation Program (PEP) Procedures. One performance evaluation audit, as described in section 3.2.7 of this appendix must be performed at one $PM_{10-2.5}$ site in each primary quality assurance organization each year. Monitoring organizations implementing $PM_{2.5}$ FRM samplers of the same method designation in both the $PM_{2.5}$ and the $PM_{10-2.5}$ networks can include the $PM_{10-2.5}$ performance evaluation audit in their respective $PM_{2.5}$ performance evaluation count as long as the performance evaluation is conducted at the $PM_{10-2.5}$ site. The calculations for evaluating bias between the primary monitor(s) and the performance evaluation monitors for $PM_{10-2.5}$ are described in section 4.1.3 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 $PM_{10}$, $PM_{2.5}$, $PM_{10-2.5}$ 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) $PM_{10-2.5}$ 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

$$d_i = \frac{meas - audit}{audit} \times 100$$

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, $X^2_{0.1,n-1}$ 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 $PM_{10-2.5}$ described in sections 3.2.8 and 3.3.8 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

$$|AB| = AB + t_{0.95,n-1} \cdot \frac{AS}{\sqrt{n}}$$

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 the one-point QC Checks. 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

$$m = \frac{1}{k} \cdot \sum_{i=1}^{k} d_i$$

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

$$CV = \sqrt{\frac{n \cdot \sum_{i=1}^{n} d_i^2 - \left(\sum_{i=1}^{n} d_i\right)^2}{2n(n-1)}} \cdot \sqrt{\frac{n-1}{X^2_{0.1,n-1}}}$$

where, $n$ is the number of valid data pairs being aggregated, and $X^2_{0.1.n-1}$ is the 10th percentile of a chi-squared distribution with n1 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 if the $d_i$'s and is calculated using equation 5 of this

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 $PM_{10-2.5}$.

4.3.1 Precision Estimate. Precision for collocated instruments for $PM_{2.5}$ and $PM_{10-2.5}$ 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 of 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 $PM_{10-2.5}$. 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

$$D = \frac{1}{n_j} \cdot \sum_{i=1}^{n_j} d_i$$

where, $n_j$ is the number of pairs and $d_1$, $d_2$, $d_{nj}$ 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

$$\text{Upper 90\% Confidence Interval} = D + t_{0.95,df} \cdot \frac{s}{\sqrt{n_j}}$$

Equation 14

$$\text{Lower 90\% Confidence Interval} = D - t_{0.95,df} \cdot \frac{s}{\sqrt{n_j}}$$

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

$$s = \sqrt{\frac{\sum_{i=1}^{n_j} (d_i - D)^2}{n_j - 1}}$$

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

$$\text{rel. error} = \frac{(\text{measured concentration} - \text{audit concentration})}{\text{audit concentration}}$$

$$= \left(\frac{1}{1 + \text{rel. error}}\right)(\text{rel. mass error} - \text{rel. volume error})$$

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

$$|\text{rel. error}| \le \frac{|\text{relative mass error}| + |\text{relative volume error}|}{1 - |\text{relative volume error}|}$$

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

$$|bias| = \frac{|massbias| + |vol.bias|}{100 - |vol.bias|} \cdot 100$$

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. The 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 relevant data for the calendar year, EPA will calculate and report the measurement uncertainty for the entire calendar year.

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

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(3) EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations. EPA QA/R–5. EPA/240/B–01/003.

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(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*.

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(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.<br>2. The assessment of data quality<br>3. The use of reference, equivalent, or approved methods.<br>4. The use of calibration standards traceable to NIST or other primary standard.<br>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. |
| —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]. |
| Annual 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 $PM_{10}$, $PM_{2.5}$, $PM_{10-2.5}$. | 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 $PM_{10}$, $PM_{2.5}$, $PM_{10-2.5}$. | Check of sampler flow rate using independent standard. | Each sampler | Once every 6 | Audit flow rate and measured flow rate indicated by the sampler. |
| Collocated sampling $PM_{2.5}$, $PM_{10-2.5}$. | Collocated samplers | 15% | Every 12 days | Primary sampler concentration and duplicate sampler concentration. |
| Performance evaluation program $PM_{2.5}$, $PM_{10-2.5}$. | Collocated samplers | 1. 5 valid audits for primary QA orgs, with ≤ 5 sites.<br>2. 8 valid audits for primary QA orgs, with > 5 sites.<br>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, $PM_{10-2.5}$, $PM_{2.5}$. | Collocated samplers | 15% | Every 12 days PSD—every 6 days. | Primary sampler concentration and duplicate sampler concentration. |
| Flow rate verification $PM_{10}$ (low Vol), $PM_{10-2.5}$, $PM_{2.5}$. | Check of sampler flow rate. | Each sampler | Once every month | Audit flow rate and measured flow rate indicated by the sampler. |
| Flow rate verification $PM_{10}$ (High-Vol), TSP. | Check of sampler flow rate. | Each sampler | Once every quarter | Audit flow rate and measured flow rate indicated by the sampler. |
| Semi-annual flow rate audit $PM_{10}$, TSP, $PM_{10-2.5}$, $PM_{2.5}$. | 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.<br>2. Check of analytical system with Pb audit strips. | 1. Each sampler<br>2. Analytical | 1. Include with TSP<br>2. Each quarter | 1. Same as for TSP.<br>2. Actual concentration. |
| Performance evaluation program $PM_{2.5}$, $PM_{10-2.5}$. | Collocated samplers | 1. 5 valid audits for primary QA orgs, with ≤ 5 sites.<br>2. 8 valid audits for primary QA orgs, with ≥ 5 sites.<br>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 OF APPENDIX A TO PART 58.—SUMMARY OF $PM_{2.5}$ 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 no. of monitors | Total no. collocated | No. of collocated FRM | No. 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 |

[71 FR 61303, Oct. 17, 2006]

EFFECTIVE DATE NOTE: At 72 FR 32211, June 12, 2007, Appendix A to Part 58 was amended by revising the third (last) sentence of section 2.4, equation 7 of section 4.1.4, the definition of the symbol ''$n$'' for equation 11 of section 4.2.1, the last sentence in section 4.2.2.2, and the definition of the symbol ''$n_j$'' for equation 12 of section 4.3.2.1, effective Sept. 10, 2007. For the convenience of the user, the revised text is set forth as follows:

## APPENDIX A TO PART 58—QUALITY ASSURANCE REQUIREMENTS FOR SLAMS, SPMS AND PSD AIR MONITORING

* * * * *

### 2. GENERAL MONITORING REQUIREMENTS

2.4 * * * 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 NPAP Coordinator at the Air Quality Assessment Division, Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency in Research Triangle Park, North Carolina.

* * * * *

### 4. CALCULATIONS FOR DATA QUALITY ASSESSMENTS

* * * * *

4.1.4 * * *

Equation 7

$$\text{Lower Probability Limit} = m - 1.96 \cdot S$$

* * * * *

4.2.1 * * *

Equation 11

where, $n$ is the number of valid data pairs being aggregated, and $X^2_{0.1, n-1}$ 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 * * * 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 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.

4.3.2.1 * * *

Equation 12

where, $n_j$ is the number of pairs and $d_1$, $d_2$, * * *, $d_{nj}$ are the biases for each of the pairs to be averaged.

* * * * *

## APPENDIX B TO PART 58 [RESERVED]

## 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 SLAMS and 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 Reserved

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 (ARMs) 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 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 or primary quality assurance organization, 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.

2.4.1.7 Data transformations are allowed to be used to demonstrate meeting the comparability requirements specified in subpart C of part 53 of this chapter. Data transformation may be linear or non-linear, but must be applied in the same way to all sites used in the testing.

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.

2.4.2.5 If data transformations are used, they must be described in the monitoring agencies Quality Assurance Project plan (or addendum to QAPP). The QAPP shall describe how often (e.g., quarterly, yearly) and under what provisions the data transformation will be updated. For example, not meeting the data quality objectives for a site over a season or year may be cause for recalculating a data transformation, but by itself would not be cause for invalidating the data. Data transformations must be applied prospectively, i.e., in real-time or near real-time, to the data output from the $PM_{2.5}$ continuous method. See reference 7 of this appendix.

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 required 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. Examples of locations that are not intended to be compared to the NAAQS may be rural background and transport sites or areas where the concentration of the pollutant is so low that it would be more useful to operate a higher sensitivity method that is not an FRM or FEM.

### 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 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.

7. Data Quality Objectives (DQOs) for Relating Federal Reference Method (FRM) and Continuous $PM_{2.5}$ Measurements to Report an Air Quality Index (AQI). Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, NC 27711. EPA 454/B–02–2002. November 2002.

[71 FR 61313, Oct. 17, 2006]

## 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, $PM_{10}$ mass sites, $PM_{2.5}$ 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 for NAAQS pollutants will be used for comparing an area's air pollution levels against the 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. The 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. |
| 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 included 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 both neighborhood and 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. 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 50,000 population or greater is termed a Metropolitan Statistical Area (MSA). A CBSA associated with at least one urbanized cluster of at least 10,000 population or greater 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. The 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. The 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 (i.e. the fifty States, District of Columbia, Puerto Rico, and the Virgin Islands) is required to operate at least one NCore site. States may delegate this requirement to a local agency. States with many MSAs 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. These additional sites shall be located to avoid proximity to large emission sources. 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, National Air Toxics Trends Stations (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 $PM_{2.5}$, $PM_{10-2.5}$ particle mass, speciated $PM_{10-2.5}$, $O_3$, $SO_2$, CO, $NO/NO_y$, wind speed, wind direction, relative humidity, and ambient temperature.

(1) Although the measurement of $NO_y$ is required in support of a number of monitoring objectives, available commercial instruments may indicate little difference in their measurement of $NO_y$ compared to the conventional measurement of $NO_X$, particularly in areas with relatively fresh sources of nitrogen emissions. Therefore, in areas with negligible expected difference between $NO_y$ and $NO_X$ measured concentrations, the Administrator may allow for waivers that permit $NO_X$ monitoring to be substituted for the required $NO_y$ monitoring at applicable NCore sites.

(2) 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 must also measure lead (Pb) either at the same sites or elsewhere within the MSA/CSA boundary. 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 Pb

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.

(d) Siting criteria are provided for urban and rural locations. Sites with significant historical records that do not meet siting criteria may be approved as NCore by the Administrator. Sites with the suite of NCore measurements that are explicitly designed for other monitoring objectives are exempt from these siting criteria (e.g., a near-roadway site).

(1) Urban NCore stations are to be generally located at urban or neighborhood scale to provide representative concentrations of exposure expected throughout the metropolitan area; however, a middle-scale site may be acceptable in cases where the site can represent many such locations throughout a metropolitan area.

(2) Rural NCore stations are to be located to the maximum extent practicable at a regional or larger scale away from any large local emission source, so that they represent ambient concentrations over an extensive 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 below, or near the $O_3$ NAAQS). Specific SLAMS $O_3$ site minimum requirements are included in Table D–2 of this appendix. The NCore sites are expected to complement the $O_3$ data collection that takes place at single-pollutant 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 population[1, 2] | Most recent 3-year design value concentrations ≥85% of any $O_3$ NAAQS[3] | Most recent 3-year design value concentrations <85% of any $O_3$ NAAQS[3, 4] |
|---|---|---|
| >10 million | 4 | 2 |
| 4–10 million | 3 | 1 |
| 350,000–<4 million | 2 | 1 |
| 50,000–<350,000[5] | 1 | 0 |

[1] Minimum monitoring requirements apply to the Metropolitan statistical area (MSA).

[2] Population based on latest available census figures.

[3] The ozone ($O_3$) National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR part 50.

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

[5] Metropolitan statistical areas (MSA) must contain an urbanized area of 50,000 or more population.

(b) Within an $O_3$ network, at least one $O_3$ site for each MSA, or CSA if multiple MSAs are involved, 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 $O_3$ monitoring program for an area. Some of these additional factors include geographic size, population density, complexity of terrain and meteorology, adjacent $O_3$ 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 $O_3$ sites are neighborhood, urban, and regional. Since $O_3$ 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 sub-region, 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 $O_3$ 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 $O_3$ 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 $O_3$ air quality days. Trajectory analyses, an evaluation of wind and emission patterns on high $O_3$ days, can also be useful in evaluating an $O_3$ monitoring network. In areas without any previous $O_3$ air quality measurements, meteorological and $O_3$ 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 $O_3$ concentrations, more specifically, downwind during periods of photochemical activity. In many cases, these maximum concentration $O_3$ sites will be located 10 to 30 miles or more downwind from the urban area where maximum $O_3$ 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 $O_3$ levels. Monitoring agencies are to consult with their EPA Regional Office when considering siting a maximum $O_3$ 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 $O_3$ 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 $O_3$ levels decrease significantly in the colder parts of the year in many areas, $O_3$ 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 $O_3$ 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 $O_3$ data to support a change to the $O_3$ 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 |

TABLE D–3 TO APPENDIX D OF PART 58. OZONE MONITORING SEASON BY STATE—Continued

| State | Begin month | End month |
|---|---|---|
| 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 is required until discontinuation is approved by the EPA Regional Administrator. Where SLAMS CO monitoring is ongoing, 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 is required until discontinuation is approved by the EPA Regional Administrator. Where SLAMS $NO_2$ monitoring is ongoing, 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 ensure tracking 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 $O_3$ 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 is required until discontinuation is approved by the EPA Regional Administrator. Where SLAMS $SO_2$ monitoring is ongoing, 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) State, and where applicable local, agencies must operate the minimum number of required $PM_{10}$ SLAMS sites listed in Table D–4 of this appendix.

TABLE D–4 OF APPENDIX D TO PART 58. $PM_{10}$ MINIMUM MONITORING REQUIREMENTS (NUMBER OF STATIONS PER MSA) [1]

| Population category | High concentration [2] | Medium concentration [3] | Low concentration [4,5] |
|---|---|---|---|
| >1,000,000 | 6–10 | 4–8 | 2–4 |
| 500,000–1,000,000 | 4–8 | 2–4 | 1–2 |
| 250,000–500,000 | 3–4 | 1–2 | 0–1 |
| 100,000–250,000 | 1–2 | 0–1 | 0 |

[1] Selection of urban areas and actual numbers of stations per area within the ranges shown in this table will be jointly determined by EPA and the State Agency.

[2] High concentration areas are those for which ambient PM10 data show ambient concentrations exceeding the $PM_{10}$ NAAQS by 20 percent or more.

[3] Medium concentration areas are those for which ambient PM10 data show ambient concentrations exceeding 80 percent of the $PM_{10}$ NAAQS.

[4] Low concentration areas are those for which ambient PM10 data show ambient concentrations less than 80 percent of the $PM_{10}$ NAAQS.

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

(b) Although microscale monitoring may be appropriate in some circumstances, 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.

(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 sub-region 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.

4.7 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–5 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–5 OF APPENDIX D TO PART 58. $PM_{2.5}$ MINIMUM MONITORING REQUIREMENTS

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

[1] Minimum monitoring requirements apply to the Metropolitan statistical area (MSA).

[2] Population based on latest available census figures.

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

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

[5] Metropolitan statistical areas (MSA) must contain an urbanized area of 50,000 or more population.

(b) Specific Design Criteria for $PM_{2.5}$. The required monitoring stations or sites must be sited to represent community-wide air quality. These sites can include sites collocated at PAMS. These monitoring stations will typically be at neighborhood or urban-scale; however, in certain instances where population-oriented micro-or middle-scale $PM_{2.5}$ monitoring are determined by the Regional Administrator to represent many such locations throughout a metropolitan area, these smaller scales can be considered to represent community-wide air quality.

(1) At least one monitoring station is to be sited in a population-oriented area of expected maximum concentration.

(2) For areas with more than one required SLAMS, a monitoring station is to be sited in an area of poor air quality.

(3) Additional technical guidance for siting $PM_{2.5}$ monitors is provided in references 6 and 7 of this appendix.

(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 SPM.

(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 sub-region 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 $O_3$ 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 equal to at least one-half (round up) the minimum required sites listed in Table D–5 of this appendix. At least one required FRM/FEM monitor in each MSA must be collocated. 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 part 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 to 40 CFR part 50.

4.8 Coarse Particulate Matter ($PM_{10-2.5}$) Design Criteria.

4.8.1 General Monitoring Requirements. (a) The only required monitors for $PM_{10-2.5}$ are those required at NCore Stations.

(b) Although microscale monitoring may be appropriate in some circumstances, middle and neighborhood scale measurements are the most important station classifications for $PM_{10-2.5}$ to assess the variation in coarse particle concentrations that would be expected across populated areas that are in proximity to large emissions sources.

(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.

(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 sub-region 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 $PM_{10-2.5}$ Chemical Speciation Site Requirements. $PM_{10-2.5}$ chemical speciation monitoring and analyses is required at NCore sites. The selection and modification of these sites must be approved by the Administrator. Samples must be collected using the monitoring methods and the sampling schedules approved by the Administrator.

## 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 $O_3$ than would otherwise be achieved through the NCore and SLAMS sites. More specifically, the PAMS program includes measurements for $O_3$, oxides of nitrogen, VOC, 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. |

TABLE D–6 OF APPENDIX D TO PART 58. MINIMUM REQUIRED PAMS MONITORING LOCATIONS AND FREQUENCIES—Continued

| Measurement | Where required | Sampling frequency (all daily except for upper air meteorology) [1] |
|---|---|---|
| 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 annual monitoring network plan required in 40 CFR 58.10. |

[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 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 1 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 D.C. 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.

[71 FR 61316, Oct. 17, 2006]

EFFECTIVE DATE NOTE: At 72 FR 3211, June 12, 2007, Appendix D to part 58 was amended by revising section 4.6(a), revising the title of Table D–4 and Footnote 1 to Table D–4; and revising section 4.7.2, effective Sept. 10, 2007. For the convenience of the user, the revised text is set forth as follows:

## APPENDIX D TO PART 58—NETWORK DESIGN CRITERIA FOR AMBIENT AIR QUALITY MONITORING

### 4. POLLUTANT-SPECIFIC DESIGN CRITERIA FOR SLAMS SITES

* * * * *

4.6 Particulate Matter ($PM_{10}$) Design Criteria.

(a) Table D–4 indicates the approximate number of permanent stations required in MSAs to characterize national and regional $PM_{10}$ air quality trends and geographical patterns. The number of $PM_{10}$ stations in areas where MSA populations exceed 1,000,000 must be in the range from 2 to 10 stations, while in low population urban areas, no more than two stations are required. A range of monitoring stations is specified in Table D–4 because sources of pollutants and local control efforts can vary from one part of the country to another and therefore, some flexibility is allowed in selecting the actual number of stations in any one locale. Modifications from these $PM_{10}$ monitoring requirements must be approved by the Regional Administrator.

TABLE D–4 OF APPENDIX D TO PART 58. $PM_{10}$ MINIMUM MONITORING REQUIREMENTS (APPROXIMATE NUMBER OF STATIONS PER MSA)[1]

* * * * *

4.7.2 Requirement for Continuous $PM_{2.5}$ Monitoring. The State, or where appropriate, local agencies must operate continuous $PM_{2.5}$ analyzers equal to at least one-half (round up) the minimum required sites listed in Table D–5 of this appendix. At least one required continuous analyzer in each MSA must be collocated with one of the required FRM/FEM/ARM monitors, unless at least one of the required FRM/FEM/ARM monitors is itself a continuous FEM or ARM monitor in which case no collocation requirement applies. 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 required continuous analyzers.

* * * * *

[1] Selection of urban areas and actual numbers of stations per area will be jointly determined by EPA and the State agency.

## 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 10 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, $PM_{10}$, $PM_{10-2.5}$, $PM_{2.5}$, and carbon monoxide sites. Middle scale $PM_{10-2.5}$ sites are required to have sampler inlets between 2 and 7 meters above ground level. Microscale Pb, $PM_{10}$, $PM_{10-2.5}$ 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 given 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) | Minimum distance [1, 2] (meters) |
|---|---|---|
| ≤1,000 | 10 | 10 |
| 10,000 | 10 | 20 |
| 15,000 | 20 | 30 |
| 20,000 | 30 | 40 |
| 40,000 | 50 | 60 |
| 70,000 | 100 | 100 |
| ≥110,000 | 250 | 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.

[2] Applicable for ozone monitors whose placement has not already been approved as of December 18, 2006.

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 hotspot 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.

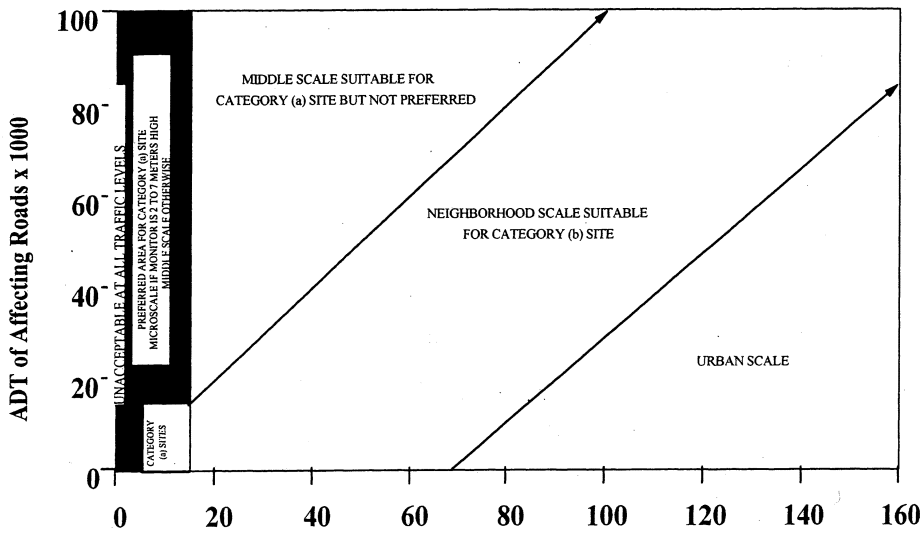


**Figure E-1. Distance of PM samplers to nearest traffic lane (meters)**

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

(a) For the reactive gases, $SO_2$, $NO_2$, and $O_3$, special probe material must be used for point analyzers. 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 the only material in the sampling train (from inlet probe to the back of the analyzer) that can be in contact with the ambient air sample for existing and new SLAMs.

(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 still produce useful data for some purposes. The 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 from 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 $PM_{10-2.5}$); 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.

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## APPENDIX F TO PART 58 [RESERVED]

## APPENDIX G TO PART 58—UNIFORM AIR QUALITY INDEX (AQI) AND DAILY REPORTING

### GENERAL REQUIREMENTS

1. What is the AQI?
2. Why report the AQI?
3. Must I report the AQI?
4. What goes into my AQI report?
5. Is my AQI report for my MSA only?
6. How do I get my AQI report to the public?
7. How often must I report the AQI?
8. May I make exceptions to these reporting requirements?

### CALCULATION

9. How does the AQI relate to air pollution levels?
10. Where do I get the pollutant concentrations to calculate the AQI?
11. Do I have to forecast the AQI?
12. How do I calculate the AQI?

### BACKGROUND AND REFERENCE MATERIALS

13. What additional information should I know?

### GENERAL REQUIREMENTS

*1. What Is the AQI?*

The AQI is a tool that simplifies reporting air quality to the general public. The AQI incorporates into a single index concentrations of 5 criteria pollutants: ozone ($O_3$), particulate matter (PM), carbon monoxide (CO), sulfur dioxide ($SO_2$), and nitrogen dioxide ($NO_2$). The scale of the index is divided into general categories that are associated with health messages.

*2. Why Report the AQI?*

The AQI offers various advantages:

a. It is simple to create and understand.

b. It conveys the health implications of air quality.

c. It promotes uniform use throughout the country.

*3. Must I Report the AQI?*

You must report the AQI daily if yours is a metropolitan statistical area (MSA) with a population over 350,000.

*4. What Goes Into My AQI Report?*

i. Your AQI report must contain the following:

a. The reporting area(s) (the MSA or subdivision of the MSA).

b. The reporting period (the day for which the AQI is reported).

c. The critical pollutant (the pollutant with the highest index value).

d. The AQI (the highest index value).

e. The category descriptor and index value associated with the AQI and, if you choose to report in a color format, the associated color. Use only the following descriptors and colors for the six AQI categories:

TABLE 1—AQI CATEGORIES

| For this AQI | Use this descriptor | And this color[1] |
|---|---|---|
| 0 to 50 | "Good" | Green. |
| 51 to 100 | "Moderate" | Yellow. |
| 101 to 150 | "Unhealthy for Sensitive Groups". | Orange. |
| 151 to 200 | "Unhealthy" | Red. |
| 201 to 300 | "Very Unhealthy" | Purple. |
| 301 and above | "Hazardous" | Maroon.[1] |

[1] Specific colors can be found in the most recent reporting guidance (Guideline for Public Reporting of Daily Air Quality—Air Quality Index (AQI)).

f. The pollutant specific sensitive groups for any reported index value greater than

100. Use the following sensitive groups for each pollutant:

| When this pollutant has an index value above 100 * * * | Report these sensitive groups * * * |
|---|---|
| Ozone ..... | Children and people with asthma are the groups most at risk. |
| $PM_{2.5}$ ..... | People with respiratory or heart disease, the elderly and children are the groups most at risk. |
| $PM_{10}$ ..... | People with respiratory disease are the group most at risk. |
| CO ..... | People with heart disease are the group most at risk. |
| $SO_2$ ..... | People with asthma are the group most at risk. |
| $NO_2$ ..... | Children and people with respiratory disease are the groups most at risk. |

ii. When appropriate, your AQI report may also contain the following:

a. Appropriate health and cautionary statements.

b. The name and index value for other pollutants, particularly those with an index value greater than 100.

c. The index values for sub-areas of your MSA.

d. Causes for unusual AQI values.

e. Actual pollutant concentrations.

*5. Is My AQI Report for My MSA Only?*

Generally, your AQI report applies to your MSA only. However, if a significant air quality problem exists (AQI greater than 100) in areas significantly impacted by your MSA but not in it (for example, $O_3$ concentrations are often highest downwind and outside an urban area), you should identify these areas and report the AQI for these areas as well.

*6. How Do I Get My AQI Report to the Public?*

You must furnish the daily report to the appropriate news media (radio, television, and newspapers). You must make the daily report publicly available at one or more places of public access, or by any other means, including a recorded phone message, a public Internet site, or facsimile transmission. When the AQI value is greater than 100, it is particularly critical that the reporting to the various news media be as extensive as possible. At a minimum, it should include notification to the media with the largest market coverages for the area in question.

*7. How Often Must I Report the AQI?*

You must report the AQI at least 5 days per week. Exceptions to this requirement are in section 8 of this appendix.

*8. May I Make Exceptions to These Reporting Requirements?*

i. If the index value for a particular pollutant remains below 50 for a season or year, then you may exclude the pollutant from your calculation of the AQI in section 12.

ii. If all index values remain below 50 for a year, then you may report the AQI at your discretion. In subsequent years, if pollutant levels rise to where the AQI would be above 50, then the AQI must be reported as required in sections 3, 4, 6, and 7 of this appendix.

CALCULATION

*9. How Does the AQI Relate to Air Pollution Levels?*

For each pollutant, the AQI transforms ambient concentrations to a scale from 0 to 500. The AQI is keyed as appropriate to the national ambient air quality standards (NAAQS) for each pollutant. In most cases, the index value of 100 is associated with the numerical level of the short-term standard (i.e., averaging time of 24-hours or less) for each pollutant. Different approaches are taken for $NO_2$, for which no short-term standard has been established, and for $PM_{2.5}$, for which the annual standard is the principal vehicle for protecting against short-term concentrations. The index value of 50 is associated with the numerical level of the annual standard for a pollutant, if there is one, at one-half the level of the short-term standard for the pollutant, or at the level at which it is appropriate to begin to provide guidance on cautionary language. Higher categories of the index are based on increasingly serious health effects and increasing proportions of the population that are likely to be affected. The index is related to other air pollution concentrations through linear interpolation based on these levels. The AQI is equal to the highest of the numbers corresponding to each pollutant. For the purposes of reporting the AQI, the sub-indexes for $PM_{10}$ and $PM_{2.5}$ are to be considered separately. The pollutant responsible for the highest index value (the reported AQI) is called the ''critical'' pollutant.

*10. Where Do I Get the Pollutant Concentrations To Calculate the AQI?*

You must use concentration data from population-oriented State/Local Air Monitoring Station (SLAMS) or parts of the SLAMS required under 40 CFR 58.20 for each pollutant except PM. For PM, you need only calculate and report the AQI on days for which you have measured air quality data (e.g., particulate monitors often report values only every sixth day). You may use particulate measurements from monitors that are not reference or equivalent methods (for example, continuous $PM_{10}$ or $PM_{2.5}$ monitors)

if you can relate these measurements by statistical linear regression to reference or equivalent method measurements.

*11. Do I Have to Forecast the AQI?*

You should forecast the AQI to provide timely air quality information to the public, but this is not required. If you choose to forecast the AQI, then you may consider both long-term and short-term forecasts. You can forecast the AQI at least 24-hours in advance using the most accurate and reasonable procedures considering meteorology, topography, availability of data, and forecasting expertise. The document ''Guideline for Developing an Ozone Forecasting Program'' (the Forecasting Guidance) will help you start a forecasting program. You can also issue short-term forecasts by predicting 8-hour ozone values from 1-hour ozone values using methods suggested in the Reporting Guidance, ''Guideline for Public Reporting of Daily Air Quality.''

*12. How Do I Calculate the AQI?*

i. The AQI is the highest value calculated for each pollutant as follows:

a. Identify the highest concentration among all of the monitors within each reporting area and truncate the pollutant concentration to one more than the significant digits used to express the level of the NAAQS for that pollutant. This is equivalent to the rounding conventions used in the NAAQS.

b. Using Table 2, find the two breakpoints that contain the concentration.

c. Using Equation 1, calculate the index.

d. Round the index to the nearest integer.

TABLE 2—BREAKPOINTS FOR THE AQI

| These breakpoints | | | | | | Equal these AQIs * * * | | Category |
|---|---|---|---|---|---|---|---|---|
| $O_3$ (ppm) 8-hour | $O_3$ (ppm) 1-hour [1] | $PM_{2.5}$ (μg/m$^3$) | $PM_{10}$ (μg/m$^3$) | CO (ppm) | $SO_2$ (ppm) | $NO_2$ (ppm) | AQI | |
| 0.000–0.064. | ..... | 0.0–15.4 | 0–54 | 0.0–4.4 | 0.000–0.034 | ([2]) | 0–50 | Good. |
| 0.065–0.084. | ..... | 15.5–40.4 | 55–154 | 4.5–9.4 | 0.035–0.144 | ([2]) | 51–100 | Moderate. |
| 0.085–0.104. | 0.125–0.164 | 40.5–65.4 | 155–254 | 9.5–12.4 | 0.145–0.224 | ([2]) | 101–150 | Unhealthy for sensitive groups. |
| 0.105–0.124. | 0.165–0.204 | [4] 65.5–150.4 | 255–354 | 12.5–15.4 | 0.225–0.304 | ([2]) | 151–200 | Unhealthy. |
| 0.125–0.374. | 0.205–0.404 | [4] 150.5–250.4 | 355–424 | 15.5–30.4 | 0.305–0.604 | 0.65–1.24 | 201–300 | Very unhealthy. |
| ([3]) ..... | 0.405–0.504 | [4] 250.5–350.4 | 425–504 | 30.5–40.4 | 0.605–0.804 | 1.25–1.64 | 301–400 | |
| ([3]) ..... | 0.505–0.604 | [4] 350.5–500.4 | 505–604 | 40.5–50.4 | 0.805–1.004 | 1.65–2.04 | 401–500 | Hazardous. |

[1] Areas are generally required to report the AQI based on 8-hour ozone values. However, there are a small number of areas where an AQI based on 1-hour ozone values would be more precautionary. In these cases, in addition to calculating the 8-hour ozone index value, the 1-hour ozone index value may be calculated, and the maximum of the two values reported.

[2] $NO_2$ has no short-term NAAQS and can generate an AQI only above an AQI value of 200.

[3] 8-hour $O_3$ values do not define higher AQI values (≥ 301). AQI values of 301 or higher are calculated with 1-hour $O_3$ concentrations.

[4] If a different SHL for $PM_{2.5}$ is promulgated, these numbers will change accordingly.

ii. If the concentration is equal to a breakpoint, then the index is equal to the corresponding index value in Table 2. However, Equation 1 can still be used. The results will be equal. If the concentration is between two breakpoints, then calculate the index of that pollutant with Equation 1. You must also note that in some areas, the AQI based on 1-hour $O_3$ will be more precautionary than using 8-hour values (see footnote 1 to Table 2). In these cases, you may use 1-hour values as well as 8-hour values to calculate index values and then use the maximum index value as the AQI for $O_3$.

$$I_p = \frac{I_{Hi} - I_{Lo}}{BP_{HI} - BP_{Lo}}\left(C_p - BP_{Lo}\right) + I_{Lo} \qquad \text{(Equation 1)}$$

Where:

$I_p$ = the index value for pollutant$_p$

$C_p$ = the truncated concentration of pollutant$_p$

$BP_{Hi}$ = the breakpoint that is greater than or equal to $C_p$

$BP_{Lo}$ = the breakpoint that is less than or equal to $C_p$

$I_{Hi}$ = the AQI value corresponding to $BP_{Hi}$

$I_{lo}$ = the AQI value corresponding to $BP_{Lo}$.

iii. If the concentration is larger than the highest breakpoint in Table 2 then you may use the last two breakpoints in Table 2 when you apply Equation 1.

EXAMPLE

iv. Using Table 2 and Equation 1, calculate the index value for each of the pollutants measured and select the one that produces

the highest index value for the AQI. For example, if you observe a $PM_{10}$ value of 210 μg/m³, a 1-hour $O_3$ value of 0.156 ppm, and an 8-hour $O_3$ value of 0.130 ppm, then do this:

a. Find the breakpoints for $PM_{10}$ at 210 μg/m³ as 155 μg/m³ and 254 μg/m³, corresponding to index values 101 and 150;

b. Find the breakpoints for 1-hour $O_3$ at 0.156 ppm as 0.125 ppm and 0.164 ppm, corresponding to index values 101 and 150;

c. Find the breakpoints for 8-hour $O_3$ at 0.130 ppm as 0.125 ppm and 0.374 ppm, corresponding to index values 201 and 300;

d. Apply Equation 1 for 210 μg/m³, $PM_{10}$:

$$\frac{150-101}{254-155}(210-155)+101=128.$$

e. Apply Equation 1 for 0.156 ppm, 1-hour $O_3$:

$$\frac{150-101}{0.164-0.125}(0.156-0.125)+101=140$$

f. Apply Equation 1 for 0.130 ppm, 8-hour $O_3$:

$$\frac{300-201}{0.374-0.125}(0.130-0.125)+201=203$$

g. Find the maximum, 203. This is the AQI. The minimal AQI report would read:

v. Today, the AQI for my city is 203 which is very unhealthy, due to ozone. Children and people with asthma are the groups most at risk.

BACKGROUND AND REFERENCE MATERIALS

*13. What Additional Information Should I Know?*

The EPA has developed a computer program to calculate the AQI for you. The program works with Windows 95, it prompts for inputs, and it displays all the pertinent information for the AQI (the index value, color, category, sensitive group, health effects, and cautionary language). The EPA has also prepared a brochure on the AQI that explains the index in detail (The Air Quality Index), Reporting Guidance (Guideline for Public Reporting of Daily Air Quality) that provides associated health effects and cautionary statements, and Forecasting Guidance (Guideline for Developing an Ozone Forecasting Program) that explains the steps necessary to start an air pollution forecasting program. You can download the program and the guidance documents at *www.epa.gov/airnow*.

[64 FR 42547, Aug. 4, 1999]

# PART 59—NATIONAL VOLATILE ORGANIC COMPOUND EMISSION STANDARDS FOR CONSUMER AND COMMERCIAL PRODUCTS

Sec.

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AUTHORITY: 42 U.S.C. 7414 and 7511b(e).

SOURCE: 64 FR 48815, Sept. 11, 1998, unless otherwise noted.

# Subpart A—General

SOURCE: 71 FR 58753, Oct. 5, 2006, unless otherwise noted.

### § 59.1 Final determinations under section 183(e)(3)(C) of the Clean Air Act.

This section identifies the consumer and commercial product categories for which EPA has determined that control technique guidelines (CTGs) will

be substantially as effective as regulations in reducing volatile organic compound (VOC) emissions in ozone nonattainment areas:

(a) Wood furniture coatings;
(b) Aerospace coatings;
(c) Shipbuilding and repair coatings;
(d) Lithographic printing materials;
(e) Letterpress printing materials;
(f) Flexible packaging printing materials;
(g) Flat wood paneling coatings; and
(h) Industrial cleaning solvents.

## Subpart B—National Volatile Organic Compound Emission Standards for Automobile Refinish Coatings

### § 59.100 Applicability and designation of regulated entity.

(a) The provisions of this subpart apply to automobile refinish coatings and coating components manufactured on or after January 11, 1999 for sale or distribution in the United States.

(b) Regulated entities are manufacturers and importers of automobile refinish coatings or coating components that sell or distribute these coatings or coating components in the United States.

(c) The provisions of this subpart do not apply to automobile refinish coatings or coating components meeting the criteria in paragraphs (c)(1) through (c)(6) of this section.

(1) Coatings or coating components that are manufactured (in or outside the United States) exclusively for sale outside the United States.

(2) Coatings or coating components that are manufactured (in or outside the United States) before January 11, 1999.

(3) Coatings or coating components that are manufactured (in or outside the United States) for use by original equipment manufacturers.

(4) Coatings that are sold in nonrefillable aerosol containers.

(5) Lacquer topcoats or their components.

(6) Touch-up coatings.

### § 59.101 Definitions.

*Adhesion promoter* means a coating designed to facilitate the bonding of a primer or topcoat on surfaces such as trim moldings, door locks, and door sills, where sanding is impracticable, and on plastic parts and the edges of sanded areas.

*Administrator* means the Administrator of the United States Environmental Protection Agency (U.S. EPA) or an authorized representative.

*Automobile* means passenger cars, vans, motorcycles, trucks, and all other mobile equipment.

*Automobile refinish coating component* means any portion of a coating, such as a reducer or thinner, hardener, additive, etc., recommended (by its manufacturer or importer) to distributors or end-users for automobile refinishing. The raw materials used to produce the components that are mixed by the end-user to prepare a coating for application are not considered automobile refinish coating components. Any reference to automobile refinishing made by a manufacturer or importer on a container or in product literature constitutes a recommendation for automobile refinishing.

*Automobile refinish coating or coating component importer, or importer,* means any company, group, or individual that brings automobile refinish coatings or coating components from a location outside the United States into the United States for sale or distribution in the United States.

*Automobile refinish coating or coating component manufacturer, or manufacturer,* means any company, group, or individual that produces or packages automobile refinish coatings or coating components for sale or distribution in the United States, including an entity which produces or packages such coatings or coating components under a private label for another party.

*Automobile refinishing* means the process of coating automobiles or their parts, including partial body collision repairs, that is subsequent to the original coating applied at an automobile original equipment manufacturing plant.

*Container* means the individual receptacle that holds a coating or coating component for storage and distribution.

*Cut-in, or jambing, clearcoat* means a fast-drying, ready-to-spray clearcoat applied to surfaces such as door jambs

and trunk and hood edges to allow for quick closure.

*Elastomeric coating* means a coating designed for application over flexible parts, such as elastomeric bumpers.

*Exempt compounds* means specific organic compounds that are not considered volatile organic compounds due to negligible photochemical reactivity. The exempt compounds are specified in § 51.100(s) of this chapter.

*Hardener* means a coating component specifically designed to promote a faster cure of an enamel finish.

*Impact-resistant coating* means a coating designed to resist chipping caused by road debris.

*Label* means any written, printed, or graphic matter affixed to or appearing upon any automobile refinish coating or coating component container or package for purposes of identifying or giving information on the product, use of the product, or contents of the container or package.

*Lacquer* means a thermoplastic coating which dries primarily by solvent evaporation, and which is resoluble in its original solvent.

*Low-gloss coating* means a coating which exhibits a gloss reading less than or equal to 25 on a 60° glossmeter.

*Mixing instructions* means the coating or coating component manufacturer's or importer's specification of the quantities of coating components for mixing a coating.

*Mobile equipment* means any equipment that is physically capable of being driven or drawn upon a highway including, but not limited to, the following types of equipment: construction vehicles (such as mobile cranes, bulldozers, concrete mixers); farming equipment (wheel tractor, plow, pesticide sprayer); hauling equipment (truck trailers, utility bodies, camper shells); and miscellaneous equipment (street cleaners, golf carts).

*Multi-colored topcoat* means a topcoat that exhibits more than one color, is packaged in a single container, and camouflages surface defects on areas of heavy use, such as cargo beds and other surfaces of trucks and other utility vehicles.

*Pretreatment wash primer* means a primer that contains a minimum of 0.5 percent acid, by weight, that is applied directly to bare metal surfaces to provide corrosion resistance and to promote adhesion of subsequent coatings.

*Primer* means any coating applied prior to the application of a topcoat for the purpose of corrosion resistance and/or adhesion.

*Primer-sealer* means any coating applied prior to the application of a topcoat for the purpose of corrosion resistance, adhesion of the topcoat, and/or color uniformity and to promote the ability of an undercoat to resist penetration by the topcoat.

*Primer-surfacer* means any coating applied prior to the application of a topcoat for the purpose of filling surface imperfections in the substrate, corrosion resistance, and/or adhesion of the topcoat.

*Reducer* means any solvent used to thin enamels.

*Underbody coating* means a coating designed for protection and sound deadening that is typically applied to the wheel wells and underbody of an automobile.

*Single-stage topcoat* means a topcoat consisting of only one coating.

*Specialty coatings* means adhesion promoters, low-gloss coatings, bright metal trim repair coatings, jambing (cut-in) clearcoats, elastomeric coatings, impact resistant coatings, underbody coatings, uniform finish blenders, and weld-through primers.

*Thinner* means any solvent used to reduce the viscosity or solids content of a coating.

*Three-stage topcoat* means a topcoat composed of a pigmented basecoat, a midcoat, and a transparent clearcoat.

*Topcoat* means any coating or series of coatings applied over a primer or an existing finish for the purpose of protection or beautification.

*Touch-up coating* means a coating applied by brush, air-brush, or nonrefillable aerosol can to cover minor surface damage.

*Two-stage topcoat* means a topcoat consisting of a pigmented basecoat and a transparent clearcoat.

*Uniform finish blender* means a coating designed to blend a repaired topcoat into an existing topcoat.

*United States* means the United States of America, including the District of Columbia, Puerto Rico, the

Virgin Islands, Guam, American Samoa, and Commonwealth of the Northern Mariana Islands.

*Volatile organic compounds* or *VOC* means any compound of carbon, other than those organic compounds that the Administrator has excluded in 40 CFR part 51, § 51.100 from this definition.

*VOC content* means the weight of VOC per volume of coating, calculated according to the procedures in § 59.104(a) of this subpart.

*Water hold-out coating* means a coating applied to the interior cavity areas of doors, quarter panels and rocker panels for the purpose of corrosion resistance to prolonged water exposure.

*Weld-through primer* means a primer that is applied to an area before welding is performed, and that provides corrosion resistance to the surface after welding has been performed.

**§ 59.102 Standards.**

(a) Except as provided in § 59.106 of this subpart, any coating resulting from the mixing instructions of a regulated entity must meet the VOC content limit given in table 1 of this subpart. VOC content is determined according to § 59.104(a).

(b) Different combinations or mixing ratios of coating components constitute different coatings. For example, coating components may be mixed one way to make a primer, and mixed another way to make a primer sealer. Each of these coatings must meet its corresponding VOC content limit in table 1 of this subpart. If the same combination and mixing ratio of coating components is recommended by a regulated entity for use in more than one category in table 1 of this subpart, then the most restrictive VOC content limit shall apply.

**§ 59.103 Container labeling requirements.**

Each regulated entity subject to this subpart must clearly display on each automobile refinish coating or coating component container or package, the day, month, and year on which the product was manufactured, or a code indicating such date.

**§ 59.104 Compliance provisions.**

(a) For the purpose of determining compliance with the VOC content limits in § 59.102(a) of this subpart, each regulated entity shall determine the VOC content of a coating using the procedures described in paragraph (a)(1) or (a)(2) of this section, as appropriate.

(1) Determine the VOC content in grams of VOC per liter of coating prepared for application according to its mixing instructions, excluding the volume of any water or exempt compounds. VOC content shall be calculated using the following equation:

$$VOC = \frac{(W_v - W_w - W_{ec})}{(V - V_w - V_{ec})}$$

Where:

VOC content = grams of VOC per liter of coating;

$W_v$ = mass of total volatiles, in grams;

$W_w$ = mass of water, in grams;

$W_{ec}$ = mass of exempt compounds, in grams;

V = volume of coating, in liters;

$V_w$ = volume of water, in liters; and

$V_{ec}$ = volume of exempt compounds, in liters.

(2) The VOC content of a multi-stage topcoat shall be calculated using the following equation:

$$VOC_{multi} = \frac{VOC_{bc} + \sum_{i=0}^{M} VOC_{mci} + 2\,(VOC_{cc})}{M + 3}$$

Where:

$VOC_{multi}$ = VOC content of a multi-stage topcoat, in grams of VOC per liter of coating;

$VOC_{bc}$ = VOC content of the basecoat, as determined in paragraph (a)(1) or (f) of this section;

$VOC_{mci}$ = VOC content of midcoat i, as determined in paragraph (a)(1) or (f) of this section;

$VOC_{cc}$ = VOC content of the clearcoat, as determined in paragraph (a)(1) or (f) of this section; and

M = Number of midcoats.

(b) To determine the composition of a coating in order to perform the calculations in paragraph (a) of this section, the reference method for VOC content is Method 24 of appendix A of 40 CFR part 60, except as provided in paragraph (f) of this section. To determine the VOC content of a coating, the regulated entity may use Method 24 of

appendix A of 40 CFR part 60, an alternative method as provided in paragraph (f) of this section, or any other reasonable means for predicting that the coating has been formulated as intended (e.g., quality assurance checks, recordkeeping). However, if there are any inconsistencies between the results of a Method 24 test and any other means for determining VOC content, the Method 24 test results will govern. The Administrator may require the regulated to conduct a Method 24 analysis.

(c) If a regulated entity recommends that its coating component(s) be combined with coating components of another regulated entity, and if the coating resulting from such a combination does not comply with the VOC content limit in § 59.102 (a) of this subpart, then the former regulated entity is out of compliance, unless the entity submits Method 24 data to the Administrator demonstrating that its recommended combination of coating components meets the VOC content limit in § 59.102(a). If the latter regulated entity does not make the recommendation of such use of the coating components, then that entity is not out of compliance for purposes of that resulting coating.

(d) Pretreatment wash primers: Except as provided in paragraph (f) of this section, the acid weight percent of pretreatment wash primers must be determined using the American Society for Testing and Materials Test Method D 1613–96 (incorporated by reference in § 59.110). If the pigment in a pretreatment wash primer prevents the use of this test method for determining the acid weight percent of the coating, then the test method shall be used for the nonpigmented component of the coating, and the acid weight percent shall be calculated based on the acid content of the nonpigmented component and the mixing ratio of the nonpigmented component to the remaining components recommended by the regulated entity.

(e) Low-gloss coatings: Except as provided in paragraph (f) of this section, the gloss reading of low-gloss coatings must be determined using the American Society for Testing and Materials Test Method D 523–89 (incorporated by reference in § 59.110).

(f) The Administrator may approve, on a case-by-case basis, a regulated entity's use of an alternative method in lieu of Method 24 for determining the VOC content of coatings if the alternative method is demonstrated to the Administrator's satisfaction to provide results that are acceptable for purposes of determining compliance with this subpart.

(g) The Administrator may determine a regulated entity's compliance with the provisions of this subpart based on information required by this subpart or any other information available to the Administrator.

[63 FR 48815, Sept. 11, 1998; 63 FR 64761, Nov. 23, 1998]

### § 59.105 Reporting requirements.

(a) Each regulated entity must submit an initial report no later than January 11, 1999 or within 180 days of the date that the regulated entity first manufactures or imports automobile refinish coatings or coating components, whichever is later. The initial report must include the information in paragraphs (a)(1) through (a)(4) of this section.

(1) The name and mailing address of the regulated entity.

(2) An explanation of each date code, if such codes are used to represent the date of manufacture, as provided in § 59.103.

(3) The street address of each of the regulated entity's facilities in the United States that is producing, packaging, or importing automobile refinish coatings or coating components subject to the provisions of this subpart.

(4) A list of the categories from table 1 of this subpart for which the regulated entity recommends the use of automobile refinish coatings or coating components.

(b) Each regulated entity must submit an explanation of any new date codes used by the regulated entity no later than 30 days after products bearing the new date code are first introduced into commerce.

### § 59.106 Variance.

(a) Any regulated entity that cannot comply with the requirements of this subpart because of circumstances beyond its reasonable control may apply in writing to the Administrator for a temporary variance. The variance application must include the information specified in paragraphs (a)(1) through (a)(3).

(1) The specific grounds upon which the variance is sought.

(2) The proposed date(s) by which the regulated entity will achieve compliance with the provisions of this subpart. This date must be no later than 5 years after the issuance of a variance.

(3) A compliance plan detailing the method(s) by which the regulated entity will achieve compliance with the provisions of this subpart.

(b) Upon receipt of a variance application containing the information required in paragraph (a) of this section, the Administrator will publish a notice of such application in the FEDERAL REGISTER and, if requested by any party, will hold a public hearing to determine whether, under what conditions, and to what extent, a variance from the requirements of this subpart is necessary and will be granted. If requested, a hearing will be held no later than 75 days after receipt of a variance application. Notice of the time and place of the hearing will be sent to the applicant by certified mail not less than 30 days prior to the hearing. At least 30 days prior to the hearing, the variance application will be made available to the public for inspection. Information submitted to the Administrator by a variance applicant may be claimed as confidential. The Administrator may consider such confidential information in reaching a decision on a variance application. Interested members of the public will be allowed a reasonable opportunity to testify at the hearing.

(c) The Administrator will issue a variance if the criteria specified in paragraphs (c)(1) and (c)(2) are met to the satisfaction of the Administrator.

(1) If complying with the provisions of this subpart would not be technologically or economically feasible, and

(2) The compliance plan proposed by the applicant can reasonably be implemented and will achieve compliance as expeditiously as possible.

(d) Any variance will specify dates by which the regulated entity will achieve increments of progress towards compliance, and will specify a final compliance date by which the regulated entity will achieve compliance with this subpart.

(e) A variance will cease to be effective upon failure of the party to whom the variance was issued to comply with any term or condition of the variance.

(f) Upon the application of any party, the Administrator may review and, for good cause, modify or revoke a variance after holding a public hearing in accordance with the provisions of paragraph (b) of this section.

### § 59.107 Addresses of EPA Regional Offices.

All requests, reports, submittals, and other communications to the Administrator pursuant to this regulation shall be submitted to the Regional Office of the EPA which serves the State or territory in which the corporate headquarters of the regulated entity resides. These areas are indicated in the following list of EPA Regional Offices.

EPA Region I (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont), Director, Office of Environmental Stewardship, Mailcode: SAA, JFK Building, Boston, MA 02203.

EPA Region II (New Jersey, New York, Puerto Rico, Virgin Islands), Director, Division of Enforcement and Compliance Assistance, 290 Broadway, New York, NY 10007–1866.

EPA Region III (Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, West Virginia), Air Protection Division, 1650 Arch Street, Philadelphia, PA 19103.

EPA Region IV (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee), Director, Air, Pesticides and Toxics, Management Division, 345 Courtland Street, NE., Atlanta, GA 30365.

EPA Region V (Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin), Director, Air and Radiation Division, 77 West Jackson Blvd., Chicago, IL 60604–3507.

EPA Region VI (Arkansas, Louisiana, New Mexico, Oklahoma, Texas), Director, Air, Pesticides and Toxics Division, 1445 Ross Avenue, Dallas, TX 75202–2733.

EPA Region VII (Iowa, Kansas, Missouri, Nebraska), Director, Air and Toxics Division,

726 Minnesota Avenue, Kansas City, KS 66101.

EPA Region VIII (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming), Director, Air and Toxics Division, 999 18th Street, 1 Denver Place, Suite 500, Denver, Colorado 80202–2405.

EPA Region IX (American Samoa, Arizona, California, Guam, Hawaii, Nevada), Director, Air and Toxics Division, 75 Hawthorne Street, San Francisco, CA 94105.

EPA Region X (Alaska, Oregon, Idaho, Washington), Director, Air and Toxics Division, 1200 Sixth Avenue, Seattle, WA 98101.

### § 59.108 State Authority.

The provisions in this regulation shall not be construed in any manner to preclude any State or political subdivision thereof from:

(a) Adopting and enforcing any emission standard or limitation applicable to a manufacturer or importer of automobile refinish coatings or components in addition to the requirements of this subpart.

(b) Requiring the manufacturer or importer of automobile refinish coatings or components to obtain permits, licenses, or approvals prior to initiating construction, modification, or operation of a facility for manufacturing an automobile refinish coating component.

### § 59.109 Circumvention.

Each manufacturer and importer of any automobile refinish coating or component subject to the provisions of this subpart must not alter, destroy, or falsify any record or report, to conceal what would otherwise be noncompliance with this subpart. Such concealment includes, but is not limited to, refusing to provide the Administrator access to all required records and date-coding information, altering the VOC content of a coating or component batch, or altering the results of any required tests to determine VOC content.

### § 59.110 Incorporations by Reference.

(a) The following material is incorporated by reference in the paragraphs noted in § 59.104. These incorporations by reference were approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. These materials are incorporated as they exist on the date of the approval, and notice of any changes in these materials will be published in the FEDERAL REGISTER.

(1) ASTM D 1613–96, Standard Test Method for Acidity in Volatile Solvents and Chemical Intermediates Used in Paint, Varnish, Lacquer, and Related Products, IBR approved for § 59.104(d).

(2) ASTM D 523–89, Standard Test Method for Specular Gloss, IBR approved for § 59.104(e).

(b) The materials are available for inspection at the Air and Radiation Docket and Information Center, U.S. EPA, 401 M St., SW., Washington, DC; and at the EPA Library (MD–35), U.S. EPA, Research Triangle Park, North Carolina, or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030, or go to: *http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html*. The materials are available for purchase from the following address: American Society for Testing and Materials (ASTM), 100 Barr Harbor Drive, West Conshohocken, PA, 19428, telephone number (610) 832–9500.

[64 FR 48815, Sept. 11, 1998, as amended at 69 FR 18803, Apr. 9, 2004]

### § 59.111 Availability of information and confidentiality.

(a) Availability of information. The availability to the public of information provided to or otherwise obtained by the Administrator under this part shall be governed by part 2 of this chapter.

(b) Confidentiality. All confidential business information entitled to protection under section 114(c) of the Act that must be submitted or maintained by each regulated entity pursuant to this section shall be treated in accordance with 40 CFR part 2, subpart B.

TABLE 1 TO SUBPART B OF PART 59—VOLATILE ORGANIC COMPOUND (VOC) CONTENT LIMITS FOR AUTOMOBILE REFINISH COATINGS

| Coating category | Grams VOC per liter | Pounds VOC per gallon [a] |
|---|---|---|
| Pretreatment wash primers | 780 | 6.5 |
| Primers/primer surfacers | 580 | 4.8 |
| Primer sealers | 550 | 4.6 |
| Single/two-stage topcoats | 600 | 5.0 |
| Topcoats of more than two stages | 630 | 5.2 |
| Multi-colored topcoats | 680 | 5.7 |
| Specialty coatings | 840 | 7.0 |

[a] English units are provided for information only. Compliance will be determined based on the VOC content limit, as expressed in metric units.

## Subpart C—National Volatile Organic Compound Emission Standards for Consumer Products

SOURCE: 63 FR 48831, Sept. 11, 1998, unless other noted.

### § 59.201 Applicability and designation of regulated entity.

(a) The provisions of the subpart apply to consumer products manufactured or imported on or after December 10, 1998 for sale or distribution in the United States.

(b) The regulated entity is: the manufacturer or importer of the product; and any distributor that is named on the product label. The manufacturer or importer of the product is a regulated entity for purposes of compliance with the volatile organic compounds (VOC) content or emission limits in § 49.203, regardless of whether the manufacturer or importer is named on the label or not. The distributor, if named on the label, is the regulated entity for purposes of compliance with all sections of this part except for § 59.203. Distributors whose names do not appear on the label are not regulated entities. If no distributor is named on the label, then the manufacturer or importer is responsible for compliance with all sections of this part.

(c) The provisions of this subpart do not apply to consumer products that meet the criteria specified in paragraph (c)(1) through (c)(7) of this section.

(1) Any consumer product manufacturer in the United States for shipment and use outside of the United States.

(2) Insecticides and air fresheners containing at least 98-percent paradichlorobenzene or at least 98-percent naphthalene.

(3) Adhesives sold in containers of 0.03 liter (1 ounce) or less.

(4) Bait station insecticides. For the purpose of this subpart, bait station insecticides are containers enclosing an insecticidal bait that does not weigh more than 14 grams (0.5 ounce), where bait is designed to be ingested by insects and is composed of solid material feeding stimulants with less than 5-percent by weight active ingredients.

(5) Air fresheners whose VOC constituents, as defined in §§ 59.202 and 59.203(f), consist of 100-percent fragrance.

(6) Non-aerosol moth proofing products that are principally for the protection of fabric from damage by moths and other fabric pests in adult, juvenile, or larval forms.

(7) Flooring seam sealers used to join or fill the seam between two adjoining pieces of flexible sheet flooring.

### § 59.202 Definitions.

The terms used in this subpart are defined in the Clean Air Act (Act) or in this section as follows:

*Administrator* means the Administrator of the United States Environmental Protection Agency (EPA) or an authorized representative.

*Aerosol cooking spray* means any aerosol product designed either to reduce sticking on cooking and baking surfaces or to be directly applied on food for the purpose of reducing sticking on cooking and baking surfaces, or both.

*Aerosol product* means a product characterized by a pressurized spray system

that dispenses product ingredients in aerosol form by means of a propellant (i.e., a liquefied or compressed gas that is used in whole or in part, such as a co-solvent, to expel a liquid or any other material from the same self-pressurized container or from a separate container) or mechanically induced force. ''Aerosol product'' does not include pump sprays.

*Agricultural use* means the use of any pesticide or method or device for the control of pests in connection with the commercial production, storage, or processing of any animal or plant crop. ''Agricultural use'' does not include the sale or use of pesticides in properly labeled packages or containers that are intended for:

(1) Household use;

(2) Use in structural pest control; or

(3) Institutional use.

*Air freshener* means any consumer product including, but not limited to, sprays, wicks, powders, and crystals designed for the purpose of masking odors, or freshening, cleaning, scenting, or deodorizing the air. This does not include products that are used on the human body, products that function primarily as cleaning products, disinfectant products claiming to deodorize by killing germs on surfaces, or institutional/industrial disinfectants when offered for sale solely through institutional and industrial channels of distribution. It does include spray disinfectants and other products that are expressly represented for use as air fresheners, except institutional and industrial disinfectants when offered for sale through institutional and industrial channels of distribution. To determine whether a product is an air freshener, all verbal and visual representations regarding product use on the label or packaging and in the product's literature and advertising may be considered. The presence of, and representations about, a product's fragrance and ability to deodorize (resulting from surface application) shall not constitute a claim of air freshening.

*All other forms* means all consumer product forms for which no form-specific VOC standard is specified. Unless specified otherwise by the applicable VOC standard, ''all other forms'' include, but are not limited to, solids,liquids, wicks, powders, crystals, and cloth or paper wipes (towelettes).

*Automotive windshield washer fluid* means any liquid designed for use in a motor vehicle windshield washer system either as an antifreeze or for the purpose of cleaning, washing, or wetting the windshield. ''Automotive windshield washer fluid'' does not include fluids placed by the manufacturer in a new vehicle.

*Bathroom and tile cleaner* means a product designed to clean tile or surfaces in bathrooms. ''Bathroom and tile cleaner'' does not include products specifically designed to clean toilet bowls or toilet tanks.

*Carburetor and choke cleaner* means a product designed to remove dirt and other contaminants from a carburetor or choke. ''Carburetor and choke cleaner'' does not include products designed to be introduced directly into the fuel lines or fuel storage tank prior to introduction into the carburetor, or solvent use regulated under 40 CFR part 63, subpart T (halogenated solvent national emission standards for hazardous air pollutants (NESHAP)).

*Charcoal lighter material* means any combustible material designed to be applied on, incorporated in, added to, or used with charcoal to enhance ignition. ''Charcoal lighter material'' does not include any of the following:

(1) Electrical starters and probes;

(2) Metallic cylinders using paper tinder;

(3) Natural gas; and

(4) Propane.

*Construction and panel adhesive* means any one-component household adhesive having gap-filling capabilities that distributes stress uniformly throughout the bonded area resulting in a reduction or elimination of mechanical fasteners.

*Consumer* means any person who purchases or acquires any consumer product for personal, family, household, or institutional use. Persons acquiring a consumer product for resale are not ''consumers'' of that product.

*Consumer product* means any household or institutional product (including

paints, coatings, and solvents), or substance, or article (including any container or packaging) held by any person, the use, consumption, storage, disposal, destruction, or decomposition of which may result in the release of VOC. For the purposes of this subpart, consumer product means any product listed in tables 1 or 2 of this subpart.

*Contact adhesive* means any household adhesive that:

(1) When applied to two substrates, forms an instantaneous, nonrepositionable bond;

(2) When dried to touch, exhibits a minimum 30-minute bonding range; and

(3) Bonds only to itself without the need for reactivation by solvents or heat.

*Container or packaging* means the part or parts of the consumer product that serve only to contain, enclose, incorporate, deliver, dispense, wrap, or store the chemically formulated substance or mixture of substances that is solely responsible for accomplishing the purposes for which the product was designed or intended. ''Container or packaging'' includes any article onto or into which the principal display panel is incorporated, etched, printed, or attached.

*Crawling bug insecticide* means any insecticide product that is designed for use against crawling arthropods including, but not limited to, ants, cockroaches, mites (but not house dust mites), silverfish, or spiders. ''Crawling bug insecticide'' does not include products for agricultural use or products designed to be used exclusively on humans or animals.

*Distributor* means any person to whom a consumer product is sold or supplied for the purposes of resale or distribution in commerce.

*Double-phase aerosol air freshener* means an aerosol air freshener with liquid contents in two or more distinct phases that requires the product container to be shaken before use to mix the phases, producing an emulsion.

*Dusting aid* means a product designed to assist in removing dust and other soils from floors and other surfaces without leaving a wax or silicone-based coating. ''Dusting aid'' does not include products that consist entirely of compressed gases for use in electronic or other specialty areas.

*Engine degreaser* means a cleaning product designed to remove grease, grime, oil, and other contaminants from the external surfaces of engines and other mechanical parts. ''Engine degreaser'' does not include any solvent used in parts washing equipment, or any solvent use regulated under 40 CFR part 63, subpart T (halogenated solvent NESHAP).

*Fabric protectant* means a product designed to be applied to fabric substrates to protect the surface from soiling from dirt and other impurities or to reduce absorption of water into the fabric's fibers. ''Fabric protectant'' does not include silicone-based products whose function is to provide water repellency, or products designed for use solely on fabrics that are labeled ''dry clean only.''

*Flea and tick insecticide* means any insecticide product that is designed for use against fleas, ticks, and their larvae, or their eggs. ''Flea and tick insecticide'' does not include products that are designed to be used exclusively on humans or animals or their bedding.

*Flexible flooring material* means asphalt, cork, linoleum, no-wax, rubber, seamless vinyl, and vinyl composite flooring.

*Floor polish or wax* means a wax, polish, or any other product designed to polish, protect, or enhance floor surfaces by leaving a protective coating that is designed to be periodically replenished. ''Floor polish or wax'' does not include ''spray buff products,'' products designed solely for the purpose of cleaning floors, floor finish strippers, products designed for unfinished wood floors, and coatings subject to 40 CFR part 59, subpart D—National Volatile Organic Compound Emission Standards for Architectural Coatings.

*Floor seam sealer* means any low viscosity specialty adhesive used in small quantities for the sole purpose of bonding adjoining rolls of installed flexible sheet flooring or to fill any minute gaps between and adjoining rolls.

*Flying bug insecticide* means any insecticide product that is designed for use against flying insects including, but not limited to, flies, mosquitoes, and gnats. ''Flying bug insecticide''

does not include ''wasp and hornet insecticide'' or products that are designed to be used exclusively on humans or animals or their bedding.

*Fragrance* means a substance or mixture of aroma chemicals, natural essential oils, and other functional components that is added to a consumer product to impart an order or scent, or to counteract a malodor.

*Furniture maintenance product* means a wax, polish, conditioner, or any other product designed for the product designed for the purpose of polishing, protecting, or enhancing finished wood surfaces other than floors. Furniture maintenance product'' does not include dusting aids, products designed solely for the purpose of cleaning, and products designed to leave a permanent finish such as stains, sanding sealers, and lacquers.

*Gel* means a colloid in which the dispersed phase has combined with the continuous phase to produce a semisolid material, such as jelly.

*General purpose adhesive* means any nonaerosol household adhesive designed for use on a variety of substrates. General purpose adhesives do not include contact adhesives or construction and panel adhesives.

*General purpose cleaner* means a product designed for general all-purpose cleaning, in contrast to cleaning products designed to clean specific substrates in certain situations. ''General purpose cleaner'' includes products designed for general floor cleaning, kitchen or countertop cleaning, and cleaners designed to be used on a variety of hard surfaces.

*Glass cleaner* means a cleaning product designed primarily for cleaning surfaces made of glass. Glass cleaner does not include products designed solely for the purpose of cleaning optical materials used in eyeglasses, photographic equipment, scientific equipment, and photocopying machines.

*Hair mousse* means a hairstyling foam designed to facilitate styling of a coiffure and provide limited holding power.

*Hair styling gel* means a high-viscosity, often gelatinous product that contains a resin and is designed for the application to hair to aid in styling and sculpting of the hair coiffure.

*Hairspray* means a consumer product designed primarily for the purpose of dispensing droplets of a resin on and into a hair coiffure to impart sufficient rigidity to the coiffure to establish or retain the style for a period of time.

*High-volatility organic compound or HVOC* means any organic compound that exerts a vapor pressure greater than 80 millimeters of mercury when measured at 20 degrees Celsius.

*Household adhesive* means any household product that is used to bond one surface to another by attachment. ''Household adhesive'' does not include products used on humans or animals, adhesive tape, contact paper, wallpaper shelf liners, or any other product with an adhesive incorporated onto or in an inert substrate.

*Household product* means any consumer product that is primarily designed to be used inside or outside of living quarters or residences, including the immediate surroundings, that are occupied or intended for occupation by individuals.

*Household use* means use of a product in a home or its immediate environment.

*Importer* means any person who brings a consumer product that was manufactured, filled, or packaged at a location outside of the United States into the United States for sale or distribution in the United States.

*Industrial use* means use for, or in, a manufacturing, mining, or chemical process or use in the operation of factories, processing plants, and similar sites.

*Insecticide* means a pesticide product that is designed for use against insects or other arthropods, excluding any product that is:

(1) For agricultural use; or

(2) A restricted use pesticide.

*Insecticide fogger* means any insecticide product designed to release all or most of its content as a fog or mist into indoor areas during a single application. Foggers may target a variety of pests including (but not limited to) fleas and ticks, crawling insects, lawn and garden pests, and flying insects. Foggers are not subject to the specific VOC limitations or other categories of insecticides list in table 1 of this subpart.

*Institutional product* means a consumer product that is designed for use in the maintenance or operation of an establishment that manufactures, transports, or sells goods or commodities, or provides services for profit; or is engaged in the nonprofit promotion of a particular public, educational, or charitable cause. ''Establishments'' include, but are not limited to, government agencies, factories, schools, hospitals, sanitariums, prisons, restaurants, hotels, stores, automobile service and parts centers, health clubs, theaters, or transportation companies. ''Institutional product'' does not include household products and products that are incorporated into or used exclusively in the manufacture or construction of the goods or commodities that are produced by the establishment.

*Institutional use* means use within the confines of or on property necessary for the operation of buildings' including, but not limited to, government agencies, factories, sanitariums, prisons, restaurants, hotels, stores, automobile service and parts centers, health clubs, theaters, transportation companies, hospitals, schools, libraries, auditoriums, and office complexes.

*Label* means any written, printed, or graphic matter affixed to, applied to, attached to, blown into, formed, molded into, embossed on, or appearing upon any consumer product package for purposes of branding, identifying, or giving information with respect to the product or to the contents of the package.

*Laundry prewash* means a product that is designed for application to a fabric prior to laundering and that supplements and contributes to the effectiveness of laundry detergents and/or provides specialized performance.

*Laundry starch product* means a product that is designed for application to a fabric, either during or after laundering, to impart and prolong a crisp look and may also facilitate ironing of the fabric. ''Laundry starch product'' includes, but it not limited to, fabric finish, sizing, and starch.

*Lawn and garden insecticide* means an insecticide product designed primarily to be used in household lawn and garden areas to protect plants from insects or other arthropods.

*Liquid* means a substance or mixture of substances that flows readily, but, unlike a gas, does not expand indefinitely (i.e., a substance with constant volume but not constant shape). ''Liquid'' does not include powders or other materials that are composed entirely of solid particles.

*Manufacturer* means any person who manufacturers or processes a consumer product. Manufacturers include:

(1) Processors who blend and mix consumer products,

(2) Contract fillers who develop formulas and package these formulas under a distributor's label;

(3) Contract fillers who manufacture products using formulas provided by a distributor; and

(4) Distributors who specify formulas to be used by a contract filler or processor.

*Nail polish remover* means a product designed to remove nail polish or coatings from fingernails or toenails.

*Nonagricultural pesticide* means and includes any substance or mixture of substances that is a pesticide as defined in section 2(u) of the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. 136–136y).

*Nonresilient flooring* means floor of a mineral content that is not flexible. ''Nonresilient flooring'' includes, but is not limited to, terrazzo, marble, slate, granite, brick, stone, ceramic tile, and concrete.

*Oven cleaner* means any cleaning product designed to clean and to remove dried food deposits from oven interiors.

*Person* means an individual corporation, partnership, association, State, any agency, department, or instrumentality of the United States, and any officer, agent, or employee thereof.

*Principal display panel(s)* means that part, or those parts, of a label that are so designed as to most likely be displayed, presented, shown, or examined under normal and customary conditions of display or purchase. Whenever a principal display panel appears more than once, all requirements pertaining to the ''principal display panel'' shall pertain to all such ''principal display panels.''

*Product category* means that applicable category which best describes the product as listed in tables 1 or 2 of this subpart and which appears on the product's principal display panel.

*Product form* means the form that most accurately describes the product's dispensing from including aerosols, gels, liquids, pump sprays, and solids.

*Pump spray* means a packaging system in which the product ingredients are expelled only while a pumping action is applied to a button, trigger, or other actuator. Pump spray product ingredients are not under pressure.

*Representative consumer product* means a consumer product that is subject to the same VOC limit in § 59.203 as the innovative product.

*Restricted use pesticide* means a pesticide that has been classified for restricted use under the provisions of section 3(d) of the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. 136–136y).

*Shaving cream* means an aerosol product that dispenses a foam lather intended to be used with a blade or cartridge razor, or other wet-shaving system in the removal of facial or other body hair.

*Single-phase aerosol air freshener* means an aerosol air freshener with liquid contents in a single homogeneous phase that does not require that the product container be shaken before use.

*Solid* means a substance or mixture of substances that does not flow or expand readily (i.e., a substance with constant volume such as the particles constituting a powder). ''Solid'' does not include liquids or gels.

*Spray buff product* means a product designed to restore a worn floor finish in conjunction with a floor buffing machine and special pad.

*Structural waterproof adhesive* means an adhesive whose bond lines are resistant to conditions of continuous immersion in fresh or salt water, and that conforms with Federal Specification MMM-A-181 (Type 1, Grade A), and MIL-A-4605 (Type A, Grade A and Grade C).

*Underarm antiperspirant* means any aerosol product that is intended by the manufacturer to be used to reduce perspiration in the human axilla by at least 20 percent in at least 50 percent of a target population.

*Underarm deodorant* means any aerosol product that is intended by the manufacturer to be used minimize odor in the human axilla by retarding the growth of bacteria that cause the decomposition of perspiration.

*United States* means the United States of America, including the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands.

*Usage directions* means the text or graphics on the consumer product's label or accompanying literature that describes to the end user how and in what quantity the product is to be used.

*Volatile organic compound or VOC* means any compound that meets the definition of a VOC, as defined under 40 CFR part 51, subpart F, and in subsequent amendments.

*Wasp and hornet insecticide* means any insecticide product that is designed for use against wasps, hornets, yellow jackets, or bees by allowing the user to spray a high-volume directed stream or burst from a safe distance at the intended pest or its hiding place.

*Wax* means an organic mixture or compound with low melting point and high molecular weight, which is solid at room temperature. Waxes are generally similar in composition to fats and oils except that they contain no glycerides. ''Wax'' includes, but is not limited to, substances such as carnauba wax, lanolin, and beeswax derived from the secretions of plants and animals; substances of a mineral origin such as ozocerite, montan, and paraffin; and synthetic substances such as chlorinated naphthalenes and ethylenic polymers.

*Wood floor wax* means wax-based products for use solely on wood floors.

[63 FR 48815, Sept. 11, 1998; 63 FR 52319, Sept. 30, 1998]

### § 59.203 Standards for consumer products.

(a) The manufacturer or importer of any consumer product subject to this

subpart small ensure that the VOC content levels in table 1 of this subpart and HVOC content levels in table 2 of this subpart are not exceeded for any consumer product manufactured or imported on or after December 10, 1998, except as provided in paragraphs (b) and (c) of this section, or in §§ 59.204 or 59.206.

(b) For consumer products for which the label, packaging, or accompanying literature specifically states that the product should be diluted prior to use, the VOC content limits specified in paragraph (a) of this section shall apply to the product only after the minimum recommended dilution has taken place. For purposes of this paragraph, ''minimum recommended dilution'' shall not include recommendations for incidental use of a concentrated product to deal with limited special applications such as hard-to-remove soils or stains.

(c) For those consumer products that are registered under the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. section 136–136y) (FIFRA), the compliance date of the VOC standards specified in paragraph (a) of this section is December 10, 1999.

(d) The provisions specified in paragraphs (d)(1) through (d)(4) of this section apply to charcoal lighter materials.

(1) No person shall manufacture or import any charcoal lighter material after December 10, 1998 that emits, on average, greater than 9 grams of VOC per start, as determined by the procedures specified in § 59.208.

(2) The regulated entity for a charcoal lighter material shall label the product with usage directions that specify the quantity of charcoal lighter material per pound of charcoal that was used in the testing protocol specified in § 59.208 for that product unless the provisions in either paragraph (e)(2)(i) or (e)(2)(ii) of this section apply.

(i) The charcoal lighter material is intended to be used in fixed amounts independent of the amount of charcoal used, such as paraffin cubes; or

(ii) The charcoal lighter material is already incorporated into the charcoal, such as certain ''bag light,'' ''instant light,'' or ''match light'' products.

(3) Records of emission testing results for all charcoal lighter materials must be made available upon request to the Administrator for enforcement purposes within 30 days of receipt of such requests.

(4) If a manufacturer or importer has submitted records of emission testing of a charcoal lighter material to a State or local regulatory agency, such existing records may be submitted under paragraph (d)(3) of this section in lieu of new test data, provided the product formulation is unchanged from that which was previously tested. Such previous testing must have been conducted in accordance with the test protocol described in § 59.208 or a test protocol that is approved by the Administrator as an alternate.

(e) Fragrances incorporated into a consumer product up to a combined level of 2 weight-percent shall not be included in the weight-percent VOC calculation.

(f) The VOC content limits in table 1 of this subpart shall not include any VOC that:

(1) Has a vapor pressure of less than 0.1 millimeters of mercury at 20 degrees Celsius; or

(2) Consists of more than 12 carbon atoms, if the vapor pressure is unknown; or

(3) Has a melting point higher than 20 degrees Celsius and does not sublime (i.e., does not change directly from a solid into a gas without melting), if the vapor pressure is unknown.

(g) The requirements of paragraph (a) of this Section shall not apply to those VOC in antiperspirants or deodorants that contain more than 10 carbon atoms per molecule and for which the vapor pressure is unknown, or that have a vapor pressure of 2 millimeters of mercury or less at 20 degrees Celsius.

(h) a manufacturer or importer may use the vapor pressure information provided by the raw material supplier as long as the supplier uses a method to determine vapor pressure that is generally accepted by the scientific community.

(i) For hydrocarbon solvents that are complex mixtures of many different compounds and that are supplied on a specification basis for use in a consumer product, the vapor pressure of

the hydrocarbon blend may be used to demonstrate compliance with the VOC content limits of this section. Identification of the concentration and vapor pressure for each such component in the blend is not required for compliance with this subpart.

### § 59.204 Innovative product provisions.

(a) Upon notification to the Administrator, a consumer product that is subject to this subpart may exceed the applicable limit in table 1 or 2 of this subpart if the regulated entity demonstrates that, due to some characteristic of the product formulation, design, delivery systems, or other factors, the use of the product will result in equal or less VOC emissions that specified in paragraph (a)(1) or (a)(2) of this section.

(1) The VOC emissions from a representative consumer product, as described in § 59.202, that complies with the VOC standards specified in § 59.203(a); or

(2) The calculated VOC emissions from a noncomplying representative product, if the product had been reformulated to comply with the VOC standards specified in § 59.203(a). The VOC emissions shall be calculated by using Equation 1.

$$E_R = E_{NC} \times \frac{VOC_{STD}}{VOC_{NC}} \qquad \text{Equation 1}$$

Where

$E_R$=The VOC emissions from the noncomplying representative product, had it been reformulated.

$E_{NC}$=The VOC emissions from the noncomplying representative product in its current formulation.

$VOC_{STD}$=The VOC standard specified in § 59.203(a).

$VOC_{NC}$=The VOC content of the noncomplying product in its current formulation.

(b) If a regulated entity demonstrates to the satisfaction of the Administrator that the equation in paragraph (a)(2) of the this section yields inaccurate results due to some characteristic of the product formulation or other factors, an alternate method that accurately calculates emissions may be used upon approval of the Administrator.

(c) A regulated entity shall notify the Administrator in writing of its intent to enter into the market an innovative product meeting the requirements of paragraph (a) of this section. The Administrator must receive the written notification by the time the innovative product is available for sale or distribution to consumers. Notification shall include the information specified in paragraph (c)(1) and (c)(2) of this section.

(1) Supporting documentation that demonstrates the emissions from the innovate product, including the actual physical test methods used to generate the data and, if necessary, the consumer testing undertaken to document product usage;

(2) Any information necessary to enable the Administrator to establish enforceable conditions for the innovative product, including the VOC content of the innovative product expressed as a weight-percentage, and test methods for determining the VOC content.

(d) At the option of the regulated entity, the regulated entity may submit a written request for the Administrator's written concurrence that the innovative product fulfills the requirements of paragraph (a) of this section. If such a request is made, the Administrator will respond as specified in paragraphs (d)(1) through (d)(3) of this section.

(1) The Administrator will determine within 30 days of receipt whether the documentation submitted in accordance with paragraph (d) of this section is complete.

(2) The Administrator will determine whether the innovative product shall be exempt from the requirements of § 59.203(a) within 90 days after an application has been deemed complete. The applicant and the Administrator may mutually agree to a longer time period for reaching a decision, and additional supporting documentation may be submitted by the applicant before a decision has been reached. The Administrator will notify the applicant of the decision in writing and specify such terms and conditions that are necessary to insure that emissions from the product will meet the emissions reductions specified in paragraph (a) of this section, and that such emissions reductions can be enforced.

(3) If an applicant has been granted an exemption to a State or local regulation for an innovative product by a State or local agency whose criteria for exemption meet or exceed those provided for in this section, the applicant may submit the factual basis for such an exemption as part of the documentation required under paragraph (d) of this section. In such case, the Administrator will make the determination required under this paragraph within 45 days after the applications is considered complete.

(e) In granting an exemption for a product, the Administrator will establish conditions that are enforceable. These conditions may include the VOC content of the innovative product, dispensing rates, application rates, and any other parameters determined by the Administrator to be necessary. The Administrator will also specify the test methods for determining conformance to the conditions established, including criteria for reproducibility, accuracy, and sampling and laboratory procedures.

(f) For any product for which an exemption has been granted pursuant to this section, the regulated entity to whom the exemption was granted shall notify the Administrator in writing within 30 days after any change in the product formulation or recommended product usage directions, and shall also notify the Administrator within 30 days after the regulated entity learns of any information that would alter the emissions estimates submitted to the Administrator in support of the exemption application.

(g) If lower VOC content limits are promulgated for a product category through any subsequent rulemaking, all exemptions granted under this section for products in the product category shall no longer apply unless the innovative product has been demonstrated to have VOC emissions less than the applicable revised VOC content limits.

(h) If the Administrator determines that a consumer product for which an exemption has been granted no longer meets the VOC emissions criteria specified in paragraph (a) of this section for an innovative product, the Administrator may modify or revoke the exemption as necessary to assure that the product will meet these criteria. The Administrator will not modify or revoke an exemption without first affording the applicant an opportunity for a public hearing to determine if the exemption should be modified or revoked.

[63 FR 48815, Sept. 11, 1998; 63 FR 52319, Sept. 30, 1998]

### § 59.205 Labeling.

(a) The container or package of each consumer product that is subject to this subpart shall clearly display the day, month, and year on which the product was manufactured, or a code indicating such date. The requirements of this provision shall not apply to products that are offered to consumers free of charge for the purposes of sampling the product.

(b) In addition, the container or package for each charcoal lighter material that is subject to this subpart shall be labeled according to the provisions of § 59.203(d)(2).

### § 59.206 Variances.

(a) Any regulated entity who cannot comply with the requirements of this subpart because of extraordinary circumstances beyond reasonable control may apply in writing to the Administrator for a variance. The variance application shall include the information specified in paragraph (a)(1) through (a)(3) of this section.

(1) The specific grounds up on which the variance is sought,

(2) The proposed date(s) by which compliance with the provisions of this subpart will be achieved. Such date(s) shall be no later than 5 years after the issuance of a variance; and

(3) A compliance plan detailing the method(s) by which compliance will be achieved.

(b) Upon receipt of a variance application containing the information required in paragraph (a) of this section, the Administrator will publish a notice of such application in the FEDERAL REGISTER and, if requested by any party, will hold a public hearing to determine whether, under what conditions, and to what extent, a variance from the requirements of this subpart

is necessary and will be granted. If requested, a hearing will be held no later than 75 days after receipt of a variance application. Notice of the time and place of the hearing will be sent to the applicant by certified mail not less than 30 days prior to the hearing. At least 30 days prior to the hearing, the variance application will be made available to the public for inspection. Information submitted to the Administrator by a variance applicant may be claimed as confidential. The Administrator may consider such confidential information in reaching a decision on a variance application. Interested members of the public will be allowed a reasonable opportunity to testify at the hearing.

(c) The Administrator will grant a variance if the criteria specified in paragraphs (c)(1) and (c)(2) of this section are met.

(1) If there are circumstances beyond the reasonable control of the applicant so that complying with the provisions of this subpart by the compliance date would not be technologically or economically feasible, and

(2) The compliance plan proposed by the applicant can be implemented and will achieve compliance as expeditiously as possible.

(d) Any variance order will specify a final compliance date by which the requirements of this subpart will be achieved and increments of progress necessary to assure timely compliance.

(e) A variance shall cease to be effective upon failure of the regulated entity to comply with any term or condition of the variance.

(f) Upon the application of any party, the Administrator may review, and for good cause, modify or revoke a variance after holding a public hearing in accordance with the procedures described in paragraph (b) of this section.

### § 59.207 Test methods.

Each manufacturer or importer subject to the provisions of § 59.203(a) shall demonstrate compliance with the requirements of this subpart through calculation of the VOC content using records of the amounts of constituents used to manufacture the product.

### § 59.208 Charcoal lighter material testing protocol.

(a) Each manufacturer or importer of charcoal lighter material subject to this subpart shall demonstrate compliance with the applicable requirements of § 59.203(d) using the procedures specified in this section. Any lighter material that has received certification from California South Coast Air Quality Management District (SCAQMD) under their Rule 1174, Ignition Method Compliance Certification Testing Protocol, will be considered as having demonstrated compliance with the applicable requirements of this subpart using the procedures in this section.

(b) The manufacturer or importer shall obtain from the testing laboratory conducting the testing, a report of findings, including all raw data sheets/charts and laboratory analytical data. The testing must demonstrate that VOC emissions resulting from the ignition of the barbecue charcoal are, on average, less than or equal to 9 grams per start. The manufacturer or importer shall maintain the report of findings.

(c) When a charcoal lighter material does not fall within the testing guidelines of this protocol, the protocol may be modified following a determination by the Administrator that the modified protocol is an acceptable alternative to the method described in this section and written approval of the Administrator.

(d) *Meteorological and environmental criteria.* (1) Testing shall be conducted under the following conditions:

(i) Inlet combustion air temperature is 16 to 27 degrees Celsius (60 to 80 degrees Fahrenheit) with a relative humidity of 20 to 80 percent;

(ii) The charcoal and lighter material are stored 72 hours before testing in a location with a relative humidity between 45 and 65 percent, and a temperature between 18 and 24 degrees Celsuis (65 to 75 degrees Fahrenheit); and

(iii) The outside wind speed, including gusts, may be no more than 16 kilometers per hour (10 miles per hour) if the test stack is exhausted outdoors, or, if the test stack is exhausted indoors, indoor air must be stagnant.

(2) Temperature and relative humidity of the combustion air shall be continuously monitored during the test. Temperature and relative humidity of the place where the charcoal and lighter material are stored prior to the test shall be monitored and recorded during the 72 hours immediately prior to the test. If the stack is exhausted outdoors, the continuous outdoor wind speed monitor shall be observed or recorded continuously during testing. If the wind speed monitor is manually observed rather than electronically recorded, the maximum wind speed observed during the test shall be recorded.

(e) *Definitions*. For the purposes of this test protocol, the following definitions shall apply:

(1) *Baseline VOC emissions* ($E_b$) means the 3.6 grams (0.008 pounds) per start of subject VOC mass emissions (calculated as $CH_2$) resulting from the ignition of charcoal by electric probe.

(2) *Emission limit for VOC* means 9 grams per start of resultant VOC emissions ($E_r$), (expressed as $CH_2$).

(3) *Equivalent* means equipment that has been demonstrated to meet or exceed the performance, design, and operation specifications of the prescribed equipment. A demonstration that equipment or a test method is a suitable alternative requires written approval from the Administrator prior to compliance testing, based on an evaluation of comparative performance specifications and/or actual performance test data.

(4) *Ignition* means the ready-to-cook condition of the charcoal determined by the temperature above the charcoal, the organic vapor concentration measured by the continuous organic emission monitor, and percent ash.

(5) *Ignition VOC emissions* ($e_I$)—means the grams (pounds) per start of total subject VOC mass emissions (expressed as $CH_2$) resulting from the ignition of charcoal by the lighter material undergoing evaluation, including both charcoal and lighter material emissions.

(6) *labeled directions* means those directions affixed to the charcoal lighter material which specify:

(1) The amount of lighter material to use per kilogram (or pound) of charcoal, unless the lighter material is already impregnated or treated in the charcoal;

(2) How to use or apply the lighter material; and

(3) How and when to light the lighter material.

(7) *Percent ash* means a qualitative observation of the ratio of visible charcoal surface area ignited (grayish/white ash) to total charcoal surface area times 100.

(8) *Reference VOC emissions* ($E_{ep}$)—means the grams (pounds) per start of subject VOC mass emissions (calculated as $CH_2$) resulting from the ignition of charcoal by the reference electric probe during the testing.

(9) *Resultant VOC emissions* ($E_r$)—means the ignition VOC emission ($E_I$) less the reference VOC emissions ($E_e$p) plus baseline emissions ($E_b$).

(10) *Start* means a 25-minute period commencing from the instant that emissions may be released from the lighter material, either by evaporation or combustion, and further characterized such that by the end of said 25-minute period, ignition is achieved.

(f) *Test structure, equipment specifications, and reference materials*. (1) The test structure is to be located in a building or fabricated total enclosure (i.e., with enclosed sides and top). The enclosure shall be such that there are no constant or intermittent air flows within it that cause fluctuations in the stack velocity and/or disruptions of air flow patterns within the test chamber containing the reference grill . (WARNING: If the stack is vented into the building enclosure, caution must be taken to avoid carbon monoxide poisoning and the reduction of oxygen.)

(2) Test structure components. The following test structure components, as shown in figures 1 and 2 of Appendix A of this subpart, shall be used:

(i) Test chamber—Standard large, prefabricated fireplace manufactured by MarcoΔ,[1] Model No. C41CF, with flue damper removed; or a fabricated structure with the same dimensions. Spacers are required at the rear of the test chamber to ensure a constant 5-centimeter (2-inch) distance between the

[1]NOTE: Mention of trade names or specific products does not constitute endorsement by the EPA.

reference grill and the rear wall of the test chamber.

(ii) Test stack—25-centimeter (10-inch) diameter galvanized steel ducting with velocity traverse port holes located approximately 8 diameters downstream from the stack outlet of the fireplace chamber and sampling ports located approximately 2½ diameters downstream of the velocity traverse ports.

(iii) Fan—25-centimeter (10-inch) diameter axial fan (duct fan) capable of maintaining an air velocity of 140 ±9 meters per minute (450 ±30 feet per minute) and located in the stack approximately 3 diameters downstream of the sampling ports.

(iv) Test stack insulation—The stack shall be insulated with fiberglass blanket insulation (or equivalent) with a minimum R-value of 6.4, that totally surrounds the stack from the top of the fireplace to the level of the blower which minimizes temperature gradients in the stack and prevents hydrocarbons from condensing on the stack wall.

(v) Stack mounts—Supports for fixing in position the stack velocity measurement device for measuring reference point velocity readings and the continuous organic emission monitor probe/meter.

(vi) Blower speed control—A rheostat for controlling voltage to the fan.

(3) Test equipment and materials. The following test equipment and materials shall be used:

(i) Continuous recording device—A YEW∆ model 4088 dot matrix, roster scanning chart recorder, Omega strip recorder with a Strawberry Tree Data Acquisition System, or equivalent, shall be used to continuously (6-second cycle) record temperatures, velocity, and continuous organic emission monitor output signals. The recording may be done manually, recording temperature using a digital potentiometer (20-second intervals), reference point velocity with a Pitot tube (20-second intervals), and continuous organic emission monitor readings with the analyzer's meter (10-second intervals).

(ii) Grill temperature probe—A type ''K'' thermocouple silver soldered to a 7.6 centimeter (3-inch) square brass plate 0.083-centimeter (0.033 inches) thick painted flat black using high temperature (> 370 degrees Celsius [> 700 degrees Fahrenheit]) paint; set on an adjustable stand to maintain 11 centimeters (4.5 inches) above the maximum height of the briquette pile and made such that it can be removed and replaced within the chamber.

(iii) Stack temperature probe—The Kurz∆ digital air velocity meter or a type ''K'' thermocouple shall be used.

(iv) Stack velocity measurement device—The velocity in meters (feet) per minute for the reference point using a Kurz∆ digital air velocity meter, Davis∆ DTA 4000 vane anemometer, or equivalent to method 1A of 40 CFR part 60, appendix A.

(v) Continuous organic emissions monitor—Century∆ Model 128 Organic Vapor Analyzer, Ratfisch∆ RS55 total hydrocarbon analyzer, or equivalent, with response in parts per million (ranges 0 to 10 parts per million, 0 to 100 parts per million, 0 to 1,000 parts per million).

(vi) Temperature and humidity monitor—A chart recorder type with humidity accuracy of ±3 percent from 15 to 85 percent.

(vii) Wind speed and direction monitor—A wind speed and direction device meeting a tolerance of ±10 percent.

(viii) Analytical balance—An electronic scale with a resolution of a ±2 grams.

(ix) Charcoal stacking ring—Rigid metal cylinder 21.6 centimeters (8.5 inches) in diameter with indicators to determine that the pile of briquettes does not exceed 12.7 centimeters (5 inches) in height.

(x) Camera—To document ignition condition of charcoal at the end of each start.

(xi) Particulate filter—Nupro∆ inline filter, Catalog Number SS–4FW–2 with 0.64 centimeter (¼-inch) Swagelok inlet and outlet or equivalent.

(xii) Barbecue Grill—The charcoal shall be ignited in a Weber∆ ''Go Anywhere'' barbecue grill (Model Number #121001), 39.4 centimeters × 24 centimeters × 12.7 centimeters (15.5 inch × 9.5 inch × 5.0 inch) with the grate 4.4 centimeters (1.75 inches) above the bottom of the grill, or another grill that meets these specifications. The grill shall be set on its bottom when placed

in the test chamber and all grill air vents shall be in full open position.

(xiii) Electric probe—A 600-watt electric probe shall be used for electric probe ignition tests.

(xiv) Untreated charcoal—The laboratory conducting the testing shall purchase ''off the shelf'' untreated charcoal from a retail outlet. Charcoal shall not be provided by the manufacturer of the charcoal lighter material to be tested or by the charcoal manufacturer. The charcoal to be used is KingsfordΔ ''Original Charcoal Briquets.'' All untreated charcoal used in the certification testing of a single ignition source is to come from the same lot as indicated by the number printed on the bag.

(xv) Treated or impregnated charcoal—If the charcoal lighter material to be tested is a substance used to treat or impregnate charcoal, the regulated entity shall provide to the laboratory conducting the tests a sample of impregnated charcoal. The sample shall be impregnated or treated barbecue charcoal that is ignited either outside of package or ignited by the package. If commercially available, the independent testing laboratory conducting the test shall purchase ''off the shelf'' from a retail outlet.

(g) *Sampling and analytical methods.* (1) Gas volumetric flow rate. Conduct a full velocity traverse using the stack velocity measurement device as shown in figure 3 of this Appendix A to this Subpart, or use Method 1A of 40 CFR part 60, appendix A. Continuously record a velocity reference point reading during each test run using a chart recorder or once every 20 seconds if using Method 1A. Calculate the volumetric flow rate using the gas velocity, moisture content, and the stack cross-sectional area. For the purposes of this protocol, the static pressure shall be assumed to be atmospheric, the molar density correction factor in the stack to be 1.0, and the moisture content to be 2 percent.

(2) Integrated VOC sample. Collect integrated VOC gas samples at the sampling port in the exhaust stack using a 40 CFR part 60, appendix A, Method 25 Total Combustion Analysis (TCA) sampling apparatus consisting of two evacuated 9-liter tanks, each equipped with flow controllers, vacuum gauges, and probes, as shown in figure 4 of Appendix A of this Subpart. Use 40 CFR part 60, appendix A, Method 25, SCAQMD Method 25.1 (incorporated by reference—§ 59.213 of this subpart), or equivalent, for analysis. Carbon monoxide, carbon dioxide, methane, and non-methane organic carbon are analyzed by the TCA and TCA/Flame Ionization Detector (FID) methods. Oxygen content is determined by gas chromatography using a thermal conductivity detector. Clean particulate filters between use by heating to 760 degrees Celsius (1400 degrees Fahrenheit) while using compressed air as a carrier for cleaning and purging.

(3) Continuous organic emissions monitor. A continuous organic emissions monitor which uses a continuous FID shall be used for each test run to measure the real time organic concentration of the exhaust as methane. Record the emission monitor response in parts per million continuously during the sampling period using a chart recorder or at least once every 10 seconds. The VOC analyzer shall be operated as prescribed in the manufacturer's directions unless otherwise noted in this protocol.

(h) *Pretest procedure.* (1) Charcoal lighter material—charcoal. Before each test run, remove charcoal from a sealed bag that has been stored for at least 72 hours in a humidity and temperature controlled room which satisfies the requirements of paragraph (d)(1) of this section and weight out 0.9 kilograms (2 pounds) of charcoal briquettes, to the nearest whole briquette over 0.9 kilograms (2 pounds), of uniform shape with no broken pieces using an analytical balance. Reseal the bag. Charcoal must be ignited within 10 minutes after removal from bag. A sealed or resealed bag of charcoal cannot be stored at the test site for greater than 45 minutes. It must be returned to a humidity and temperature controlled room from 72 hours. The lighter material must be purchased, stored, weighed, and handled the same as the barbecue charcoal.

(i) For the reference VOC emission tests using an electric probe, place a single layer of charcoal, slightly larger than the area/circle of the electric probe heating element, onto the grate.

Place the heating element on top of this first layer and cover the heating element with the remaining charcoal briquettes.

(ii) For the ignition VOC emissions tests, arrange the briquettes on the barbecue grate in the manner specified by the ignition manufacturer's directions. If these manufacturer's directions do not specify a stacking arrangement for the briquettes, randomly stack the briquettes in a pile using the stacking ring described in paragraph (f)(3)(ix) of this section.

(2) Charcoal lighter material—or impregnated charcoal. Store, handle, weigh, and stack barbecue charcoal that is designed to be lit without the packaging, the same as in paragraph (h)(1) of this section. For those products which require both the package and charcoal be lit, weigh the whole package—do not remove charcoal. Weigh an empty package (not the same one to be used during the test). Subtract the package weight from the overall weight of the package and charcoal. The full package and empty package must be stored, handled, and weighed the same as in paragraph (h)(1) of this section. If the difference (the charcoal weight) is between 0.7 to 1.4 kilograms (1.5 to 3.0 pounds), the test may proceed. The emissions measured (E) in Equation 5 of paragraph (k)(7) of this section must be adjusted to a 0.9 kilogram (2-pound) charge. Place packaged barbecue charcoal on the grate in the manner specified by the manufacturer's directions.

(3) Initial meteorological and environmental criteria in paragraph (d) shall be complied with.

(4) The stack velocity must be set before each day of testing at 140 ±9 meters per minute (450 ±30 feet per minute) by performing a velocity traverse as specified in paragraph (g)(1) of this section. The velocity will be attained by adjusting the axial fan speed using a rheostat.

(5) The fireplace shall be conditioned at the start of each day before sampling tests by using a grill ignited by the electric probe. If a time period of over 60 minutes between sampling test runs occur, the condition step must be repeated.

(6) Before each test run, leak check the continuous organic emissions monitor by blocking the flow to the probe. Allow the instrument to warm up for the duration specified by the manufacturer's directions. Select the 0 to 100 parts per million range. Check the battery level and hydrogen pressure. Zero with hydrocarbon-free air (<0.1 parts per million hydrocarbons as methane) span with 90 parts per million methane in ultra pure air. Zero and span another instrument selection range if needed for test purposes.

(7) Before the testing program begins, establish a point of average concentration of organics in the stack by using a continuous organic emissions monitor and a grill with charcoal ignited by the electric probe 40 minutes after initial release of emissions. Record the continuous organic emissions monitor traverse data.

(8) Prepare the integrated VOC sampling equipment and perform the required leak checks. Fit the probes with nozzles housing two micron particulate filters. Insert the probes and nozzles into the sampling port to draw a sample of the exhaust gas from the point of average organic concentration as determined from the continuous organic emissions monitor sample traverse described in paragraph (h)(4) of this section. Also, position the nozzles such that they point downstream in the stack. Obtain the samples concurrently and continuously over the test run.

(9) Insert the continuous organic emissions monitor probe into the sampling port to draw a sample of the exhaust gas from the point of average organic concentration as determined from the continuous organic emissions monitor sample traverse described in paragraph (h)(7) of this section.

(i) *Test procedure*. The labeled directions, as defined in paragraph (e) of this section, shall be followed throughout the course of the testing. In cases where the directions are incompatible with this protocol, circumvent the intent of this protocol, or are unclear (subject to different interpretations) and inadequate, the Administrator must be informed in writing of the nature of the conflict, as well as the proposed resolution, prior to commencing testing. When the labeled directions for

a charcoal lighter material do not fall within the testing guidelines of this protocol, the protocol may only be modified upon written approval of the Administrator.

(1) Place the bottom of the barbecue grill on the floor of the fireplace, 5 centimeters (2 inches) from the rear wall. Ignite charcoal as specified by manufacturer's labeled directions.

(2) For electric probe ignition, carefully remove probe without disturbing charcoal after 10 minutes of operation.

(3) For fluid ignition, simultaneously match light fluid on charcoal and fluid that has fallen to the bottom of the grill.

(4) Place the grill temperature probe 11 centimeters (4.5 inches) above the top of the charcoal immediately after the charcoal lighter material flame goes out, or before, if the lighter material does not flame.

(5) Conduct at least six test runs for both the electric probe ignition and for the lighter material being evaluated. Alternate these lighter material for all 12 runs. All runs must be conducted over 3 consecutive days or less. Alternatively, baseline emissions testing (using the electric probe) may be applied to other test runs provided the test runs occur within 4 months of the baseline testing. Integrated VOC sampling and continuous organic emissions monitoring begin for each test run when the charcoal lighter material and/or materials start to generate/release organics (this will be the time of pouring for lighter fluids and the time of ignition for most other ignition sources). Option: Because the manufacturer of treated or impregnated charcoal supplies both the lighter material and barbecue charcoal, they may apply the 9 grams VOC per start emission limit as an absolute value without an adjustment for the VOC emissions from an electric probe.

(6) Sampling ends for each test run when all the following conditions are met:

(i) The temperature 11 centimeters (4.5 inches) above the maximum height of the briquette pile, using the grill temperature probe described in paragraph (d)(3)(ii) of this section, is at least 93 degrees Celsius (200 degrees Fahrenheit);

(ii) The continuous organic emissions monitor is reading below 30 parts per million for at least 2 minutes;

(iii) The test sampling has continued for 25 minutes (but not more) and

(iv) The charcoal surface is 70 percent covered with ash (to be documented with photograph on top and 60 degrees above the horizon).

(7) During the sampling test runs, temperatures (excluding ambient) and continuous organic emission monitor readings shall be recorded and shall comply with the requirements in paragraph (b) of this section. Humidity, wind speed, and ambient temperature readings shall be monitored and shall comply with the requirements in paragraph (b) of this section.

(8) Collect one blank sample for VOC and one ambient air sample during one run of each day per paragraph (k) of this section.

(j) *Post-run procedure.* (1) Record temperatures (including ambient), humidity, wind speed, and continuous organic emissions monitor reading.

(2) Record the drift using zero and span gases. Leak check and span the continuous organic emissions monitor as described in paragraph (h)(6) of this section for the next run.

(3) Leak check and disassemble the integrated VOC sampling equipment as described in Method 25 of 40 CFR part 60, appendix A or SCAQMD Method 25.1 (incorporated by reference—see § 59.213 of this subpart), or equivalent.

(4) Thoroughly clean grill surfaces of all residue before conducting next ignition run.

(k) *Calculations.* Calculations shall be carried out to at least one significant digit beyond that of the acquired data, and then rounded off after final calculation to two significant digits for each run. All rounding off of numbers should be in accordance with the American Society for Testing and Materials (ASTM) E 380–93, Standard Practice for Use of the SI International System of Units, procedures (incorporated by reference—see § 59.213 of this subpart).

(1) Calculate the average stack reference point temperature during sampling ($t_{sr}$).

(2) Calculate the average measured velocities (in meters per minute [feet per minute]): Traverse ($u_t$), traverse

reference point ($u_{tr}$), and reference point during sampling ($u_{sr}$).

(3) Calculate the corrected average sampling velocity ($u_s$) by applying Equation 2:

$$u_s = u_{sr} \frac{u_t}{u_{tr}} \qquad \text{Equation 2}$$

(4) Calculate the average flow rate ($Q_s$) in cubic meters per minute (cubic feet per minute) by applying Equation 3:

$$Q_s = u_s A \qquad \text{Equation 3}$$

Where

A=Duct cross-sectional area, (square meters [square feet]

(5) Correct the flow rate to dry standard conditions ($Q_{ds}$) by applying Equation 4. Assume the static pressure to be atmospheric and the molar density correction factor to be 1.0

$$Q_{ds} = \frac{T_s}{\left(T_S + t_{sr}\right)} (1 - H)\, Q_s \qquad \text{Equation 4}$$

Where

$T_s$=289 K (520 R)
$T_S$=273 K (460 R)
H=Percent moisture-100
=0.02

(6) Calculate the average total gaseous non-methane organic carbon for each duplicate sample run analyzed.

(7) Calculate the grams (pounds) of VOC as $CH_2$ emitted per start (normalized to 0.9 kilograms [2 pounds] of charcoal) for each run using Equation 5:

$$E = \frac{A}{B} * \frac{C}{10^6} * D * d * \frac{N}{M} Q_{ds} \qquad \text{Equation 5}$$

Where

E=Emissions of VOC per start for each test run (grams VOC/start [pounds VOC/start])
A=Hydrocarbon molecular weight
=14.0268 grams per gram-mole (14.0268 pounds per pound-mole)
B=Carbon number
=1
C=Average concentration for each duplicate run of total gaseous nonmethane organic compounds as $CO_2$ (parts per million, from lab analysis sheet)
D=Sampling duration
=25 minutes
d=Molar density of gas at standard conditions
=42.33 gram-mole per cubic meter (0.0026353 pound-mole per cubic foot)
N=Normalized mass (0.9 kilograms [2 pounds])
M=Mass of charge (kilograms [pounds])

(8) Calculate the average VOC emissions for each lighter material tested. Identify and discard statistical outliers. Note a minimum of five valid results are required for a determination. This procedure for eliminating an outlier may only be performed once for each lighter material tested.

(9) Using Equation 6, calculate the resultant VOC emissions per start ($E_r$) and determine if it is less than or equal to the 9 grams VOC per start emission limit.

$$E_r = e_i - e_{ep} + E_b \qquad \text{Equation 6}$$

Where

$e_i$=Average emissions of VOC per start from the charcoal lighter material being evaluated (grams VOC/start [pounds VOC/start] expressed as $CH_2$)
$e_{ep}$=Average reference VOC emissions per start from the ignition by electric probe (grams VOC/start [pounds VOC/start] expressed as $CH_2$)
=0 grams VOC/start (0 pounds VOC/start) for treated or impregnated charcoal
$E_b$=Standard baseline VOC emissions per start from the ignition by electric probe (expressed as $CH_2$)
=0 grams VOC/start (0 pounds VOC/start) for treated or impregnated charcoal
=3.6 grams VOC/start (0.008 pounds VOC/start) for all other charcoal lighter material

(l) *Recordkeeping*. A record of the following charcoal lighter material compliance test information shall be kept for at least 5 years:

(1) Real time temperature and continuous organic emissions monitor readings from continuous chart recorder and/or manual reading of temperatures and the continuous organic emissions monitor output.

(2) A description of quality assurance/quality control (QA/QC) procedures followed for all measuring equipment and calibration test data.

(3) A description of QA/QC procedures followed for all sampling and analysis equipment and calibration test data.

(4) Time and quantity of blanks and ambient air samples.

(5) Chain of custody for samples.

(6) Labeled directions.

(7) Field notes and data sheets.

(8) Calculation/averaging sheets/printouts.

(9) Sample (in its normal package from the same lot) of barbecue charcoal and lighter material used for testing.

(10) Formulation of lighter material tested (indicate if the information is to be handled confidentially).

(11) Photographs documenting charcoal surface ash coverage.

(m) *Quality Assurance/Quality Control (QA/QC) Requirements.* The QA/QC guidelines in the EPA's Quality Assistance Handbook (EPA 600.4–77–027b) shall be followed. In addition, the following procedures shall be used:

(1) A blank sample for VOC shall be performed once each day, during the start period of one of the lighter materials, using the integrated VOC sampling apparatus.

(2) An ambient air sample for VOC shall be taken once each day, during the start period of one of the lighter materials, using the integrated VOC sampling apparatus with NuproΔ 2 micron filters.

(3) Traceability certificates shall be provided for all calibration gases used for the continuous organic emissions monitor and integrated VOC analysis.

(4) Grill temperature probe shall be calibrated using the procedures in ASTM Method E220–86 (incorporated by reference as specified in United States § 59.213).

(5) Supply documentation for place of purchase ( or origin if experimental) and chain of custody for lighter material tested. Documentation to be included for both treated and impregnated charcoal.

(6) Supply documentation for place of purchase and chain of custody for untreated charcoal.

[63 FR 48815, Sept. 11, 1998; 63 FR 52319, Sept. 30, 1998]

### § 59.209 Recordkeeping and reporting requirements.

(a) The distributor that is named on the product label shall maintain the records specified in paragraphs (a)(1) and (a)(2) of this section, unless the manufacturer or importer has submitted to the Administrator a written certification that the manufacturer or importer will maintain the records for the distributor in accordance with paragraph (a)(3) of this section. If no distributor is named on the label, the manufacturer or importer must maintain the specified records. The records must be retained for at least 3 years and must be in a form suitable and readily available for inspection and review.

(1) Records or formulations being manufactured or imported on or after December 10, 1998 for all consumer products subject to § 59.213(a), or December 10, 1999 for all consumer products subject to § 59.203(c) and

(2) Accurate records for each batch of production, starting on December 10, 1998 for all consumer products subject to § 59.203(a) or December 10, 1999 for all consumer products subject to § 59.203(c), of the weight-percent and chemical composition of the individual product constituents.

(3) By providing this written certification to the Administrator, the certifying manufacturer accepts responsibility for compliance with the recordkeeping requirements in paragraphs (a)(1) and (a)(2) of this section with respect to any products covered by the written certification. Failure to maintain the required records may result in enforcement action by the EPA against the certifying manufacturer in accordance with the enforcement provisions applicable to violations of these provisions by regulated entities. The certifying manufacturer may revoke the written certification by sending a written statement to the Administrator and the regulated entity giving at least 90 days notice that the certifying manufacturer is rescinding acceptance of responsibility for compliance with the recordkeeping requirements listed in this paragraph. Upon expiration of the notice period, the regulated entity must assume responsibility for maintaining the records specified in this paragraph. Written certifications and revocation statements, to the Administrator from the certifying manufacturer shall be signed by the responsible official of the certifying manufacturer,

provide the name and address of the certifying manufacturer, and be sent to the appropriate EPA Regional Office at the addresses listed in § 59.210 of this subpart. Such written certifications are not transferable by the manufacturer.

(b) If requested by the Administrator, product VOC content must be demonstrated to the Administrator's satisfaction to comply with the VOC content limits presented in § 59.203(a).

(c) Each manufacturer or importer subject to the provisions of § 59.203(d) shall maintain records specified in either paragraph (c)(1) or (c)(2) of this section for each charcoal lighter material.

(1) Test report from each certification test performed as specified in § 59.208(b) and all information and data specified in § 59.208(l); or

(2) Records of emission testing, which was performed by a method determined by the Administrator to be an acceptable alternative to that described in § 59.208, previously submitted to a State or local regulatory agency.

(d) The distributor that is named on the product label, or if no distributor is named on the label, the manufacturer or importer, shall submit by the applicable compliance date, or within 30 days after becoming a regulated entity, a one-time Initial Notification Report including the information specified in paragraphs (d)(1) through (d)(5) of this section.

(1) Company name;

(2) Name, title, phone number, address, and signature or certifying company official;

(3) A list of product categories and subcategories subject to § 59.203 for which the company is currently the regulated entity;

(4) A description of date coding systems, clearly explaining how the date of manufacture is marked on each sales unit of subject consumer products; and

(5) The name and location of the designated recordkeeping agent, if the records specified in paragraphs (a)(1) and (a)(2) are to be maintained by the manufacturer.

(e) If a regulated entity changes the date coding system reported according to paragraph (d)(4) of this section, the regulated entity shall notify the Administrator of such changes within 30 days following the change.

(f) If requested by the Administrator, the following information shall be made available within 30 days after receiving the request:

(1) Location of facility(ies) manufacturing, importing, or distributing subject consumer products;

(2) A list of product categories and subcategories, as found in tables 1 and 2 of this subpart, that are manufactured, imported, or distributed at each facility; and

(3) Location where VOC content records are kept for each subject consumer product.

(g) Each manufacturer or importer subject to the innovative product provisions in § 49.204 shall submit notifications as indicated in § 59.204(d) and (e).

### § 59.210 Addresses of EPA Regional Offices.

All requests, reports, submittals, and other communications to the Administrator pursuant to this regulation shall be submitted to the Regional Office of the EPA which serves the State or territory in which the corporate headquarters of the regulated entity resides. These areas are indicated in the following list of EPA Regional Offices:

EPA Region I (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont), Director, Office of Ecosystem Protection, J.F.K. Federal Building, Boston, MA 02203–2211.

EPA Region II (New Jersey, New York, Puerto Rico, Virgin Islands), Director, Division of Environmental Planning and Protection, 290 Broadway, New York, NY 10007.

EPA Region III (Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, West Virginia), Director, Air, Radiation, and Toxics Division, 841 Chestnut Building, Philadelphia, PA 19107.

EPA Region IV (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee), Director, Air, Pesticides, and Toxics Management Division, 61 Forsyth Street, Atlanta, GA 30303.

EPA Region V (Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin), Director, Air and Radiation Division, 77 West Jackson Blvd., Chicago, IL 60604–3507.

EPA Region VI (Arkansas, Louisiana, New Mexico, Oklahoma, Texas), Director, Multimedia Planning and Permitting Division, 1445 Ross Avenue, Dallas, TX 75202–2733.

EPA Region VII (Iowa, Kansas, Missouri, Nebraska), Director, Air, RCRA, and Toxics Division, 726 Minnesota Avenue, Kansas City, KS 66101.

EPA Region VIII (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming), Director, Office of Pollution Prevention, State, and Tribal Assistance, 999 18th Street, Suite 500, Denver, Colorado 80202–2466.

EPA Region IX (American Samoa, Arizona, California, Guam, Hawaii, Nevada) Director, Air Divisions, 75 Hawthorne Street, San Francisco, CA 94105.

EPA Region X (Alaska, Oregon, Idaho, Washington), Director, Office of Air Quality, 1200 Sixth Avenue, Seattle, WA 98101.

### § 59.211 State authority.

(a) The provisions in this regulation shall not be construed in any manner to preclude any State or political subdivision thereof from:

(1) Adopting and enforcing any emission standard or limitation applicable to a regulated entity.

(2) Requiring the regulated entity to obtain permits, licenses, or approvals prior to initiating construction, modification, or operation of a facility for manufacturing a consumer product.

(b) [Reserved]

### § 59.212 Circumvention.

No regulated entity subject to these standards shall alter, destroy, or falsify any record or report to conceal what would otherwise be noncompliance with these standards. Such concealment includes, but is not limited to refusing to provide the Administrator access to all required records and date-coding information, altering the percent VOC content of a product batch, or altering the results of any required performance tests.

### § 59.213 Incorporations by reference.

(a) The materials listed in this section are incorporated by reference in the paragraphs noted in § 59.207. These incorporations by reference were approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. These materials are incorporated as they exist on the date of the approval, and notice of any changes in these materials will be published in the FEDERAL REGISTER. The materials are available for purchase at the corresponding addresses noted below, and all are available for inspection at the Air and Radiation Docket and Information Center, U.S. EPA, 401 M St., SW., Washington, DC 20460, the EPA Library (MD–35), U.S. EPA, Research Triangle Park, NC 27711, or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030, or go to: *http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.*

(b) The materials listed below are available for purchase from at least one of the following addresses: American Society for Testing and Materials (ASTM), 1916 Race Street, Philadelphia, PA, 19103; SCAQMD Subscription Services, P.O. Box 4932; 21865 Copley Drive, Diamond Bar, CA 91765–0932; or University Microfilms International, 300 North Zeeb Road, Ann Arbor MI, 48106.

(1) ASTM Method E220–86 Standard Method for Calibration of Thermocouples by Comparisons Techniques, incorporation by reference (IBR) approved for § 59,208(m)(4).

(2) ASTM Method E380–82 Metric Practice, IBR approved for § 59.208(k).

(3) SCAQMD Method 25.1, March 1989 Determination of Total Gaseous Non-Methane Organic Emissions as Carbon (amended February 26, 1991) IBR approved for § 59.208(g)(2).

[63 FR 48831, Sept. 11, 1998, as amended at 69 FR 18803, Apr. 9, 2004]

### § 59.214 Availability of information and confidentiality

(a) Availability of information. Specific reports or records required by this subpart are not available to the public. The Administrator will, upon request, provide information as to the compliance status of a product or regulated entity.

(b) Confidentiality. All confidential business information entitled to protection under section 114(c) of the CAA that must be submitted or maintained by a regulated entity pursuant to this section shall be treated in accordance with 40 CFR part 2, Subpart B.

TABLE 1 TO SUBPART C—VOC CONTENT LIMITS BY PRODUCT CATEGORY

| Product category | VOC content limit (weight-percent VOC) |
|---|---|
| Air fresheners: | |
| Single-phase | 70 |
| Double-phase | 30 |
| Liquids/pump sprays | 18 |
| Solids/gels | 3 |
| Automotive windshield washer fluid | 35 |
| Bathroom and tile cleaners: | |
| Aerosols | 7 |
| All other forms | 5 |
| Carburetor and choke cleaners | 75 |
| Cooking sprays—aerosol | 18 |
| Dusting aids: | |
| Aerosols | 35 |
| All other forms | 7 |
| Engine degreasers | 75 |
| Fabric protectants | 75 |
| Floor polishes/waxes: | |
| Products for flexible flooring materials | 7 |
| Products for nonresilient flooring | 10 |
| Wood floor wax | 90 |
| Furniture maintenance products-aerosol | 25 |
| General purpose cleaners | 10 |
| Glass cleaners: | |
| Aerosols | 12 |
| All other forms | 8 |
| Hairsprays | 80 |
| Hair mousses | 16 |
| Hair Styling gels | 6 |
| Household adhesives: | |
| Aerosols | 75 |
| Contact | 80 |
| Construction and panel | 40 |
| General purpose | 10 |
| Structural waterproof | 15 |
| Insecticides: | |
| Crawling bug | 40 |
| Flea and tick | 25 |
| Flying bug | 35 |
| Foggers | 45 |
| Lawn and Garden | 20 |
| Laundry prewash: | |
| Aerosols/solids | 22 |
| All other forms | 5 |
| Laundry starch products | 5 |
| Nail polish removers | 85 |
| Oven cleaners: | |
| Aerosols/pump | 8 |
| Liquids | 5 |
| Shaving creams | 5 |

TABLE 2 TO SUBPART C—HVOC[1] CONTENT LIMITS FOR UNDERARM DEODORANTS AND UNDERARM ANTIPERSPIRANTS

| Product category | Percent HVOC content limit (weight-percent HVOC) |
|---|---|
| Underarm antiperspirants—aerosol | 60 |
| Underarm deodorants—aerosol | 20 |

[1] High-volatility organic compound (HVOC) are VOC with vapor pressure greater than 80 millimeters of mercury at 20 degrees Celsius.

APPENDIX A TO SUBPART C OF PART 59—FIGURES

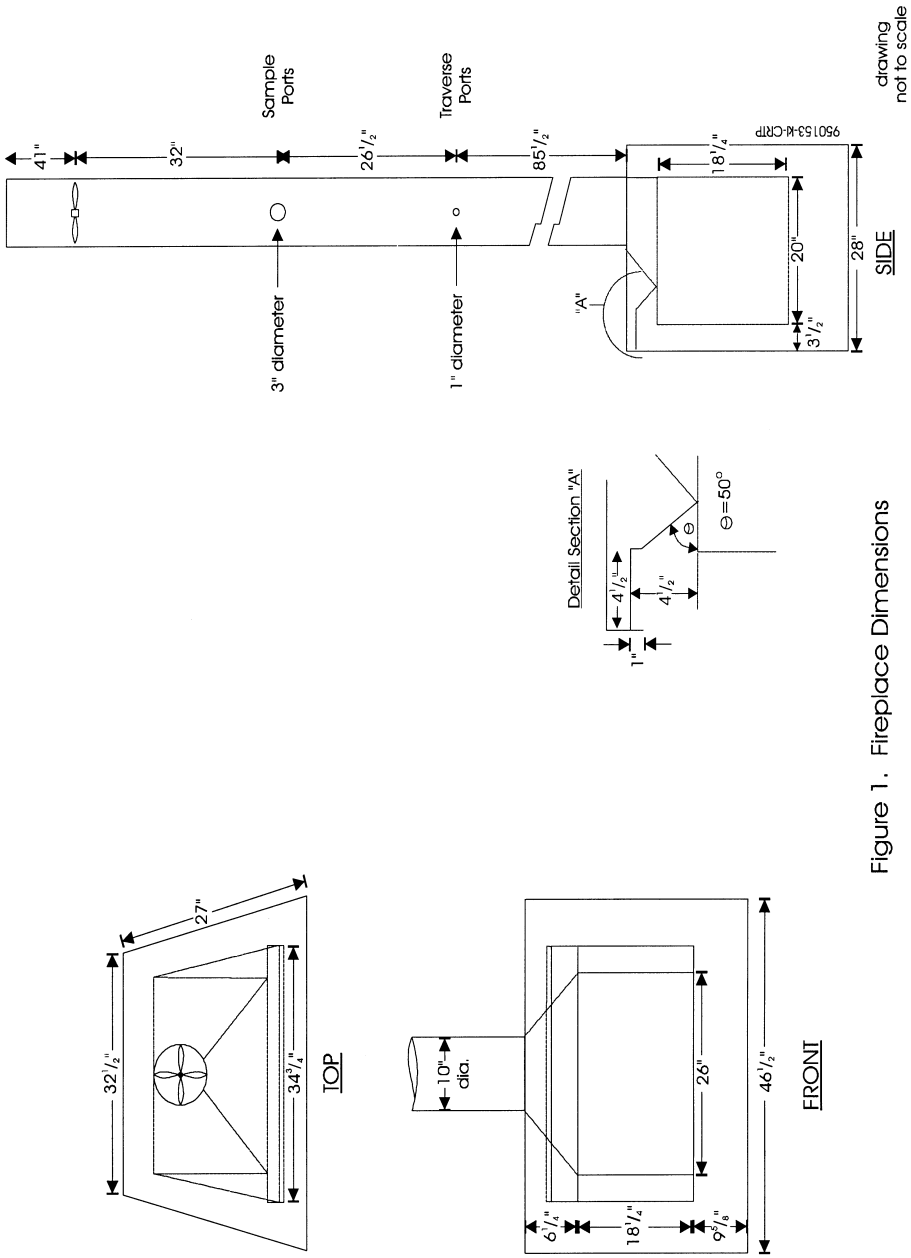
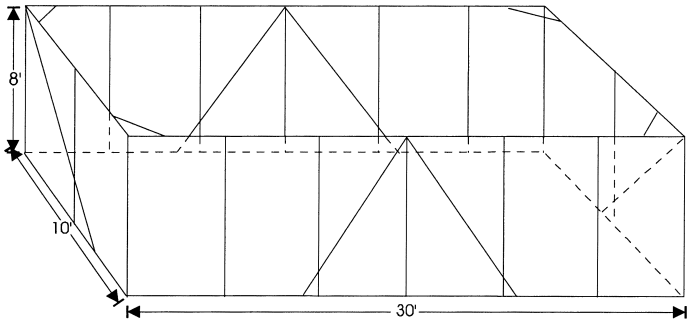
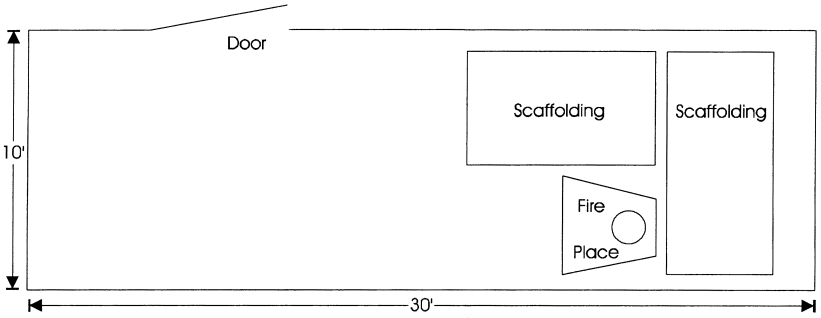


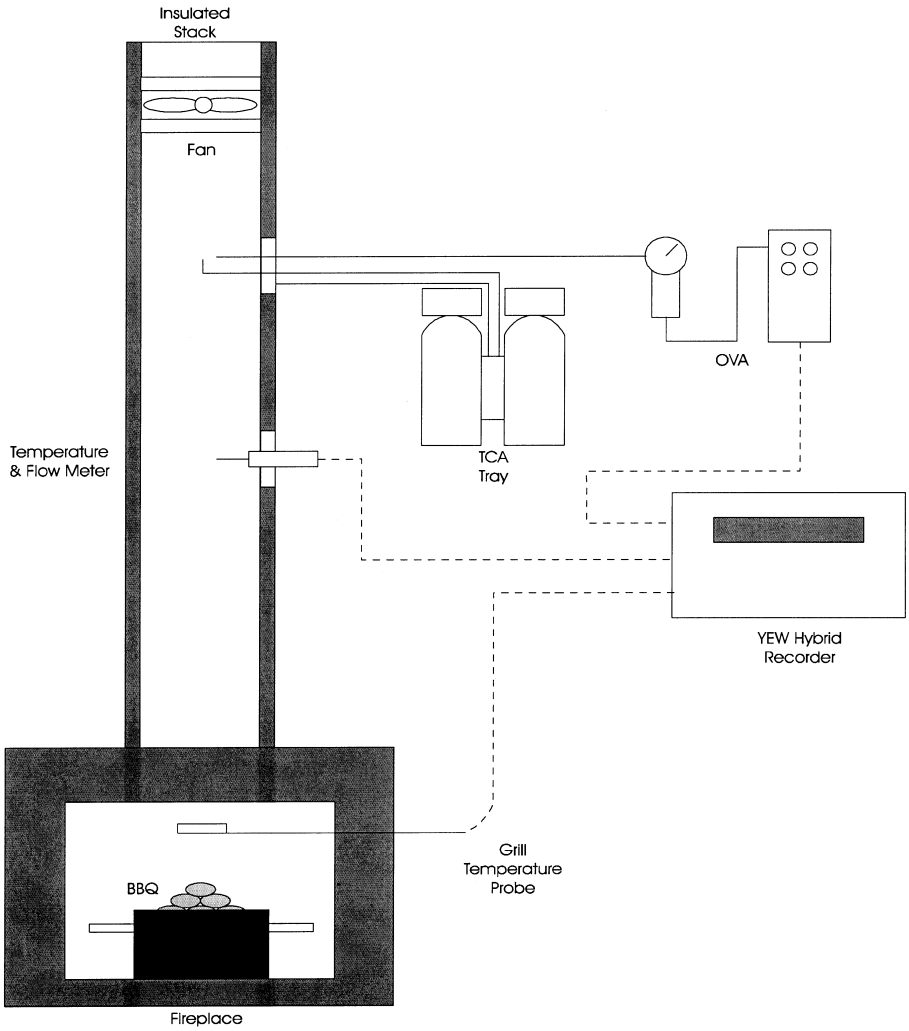

Figure 1. Fireplace Dimensions



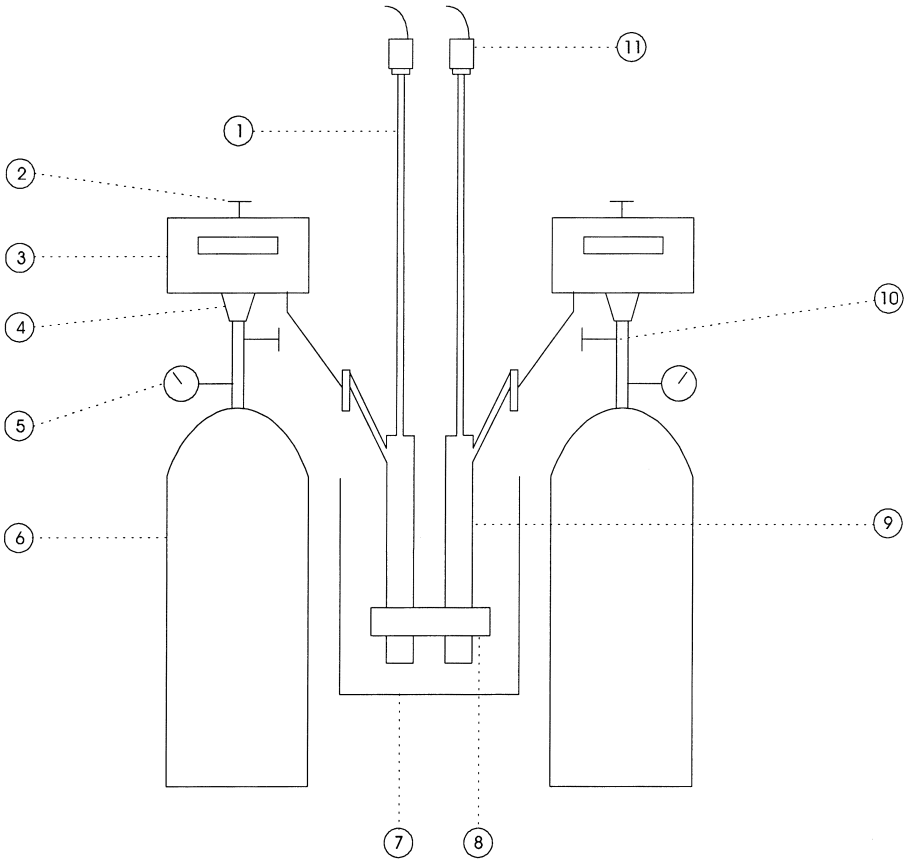

950154-kl-CRTP

Figure 2. Suggested Enclosure Design




950155C.jo.RTP

Figure 3. Sampling Apparatus Set-up with Chart Recorder




950156C-jo-RTP

Figure 4. Sampling Apparatus for Organics

## Subpart D—National Volatile Organic Compound Emission Standards for Architectural Coatings

SOURCE: 63 FR 48877, Sept. 11, 1998, unless otherwise noted.

### § 59.400 Applicability and compliance dates.

(a) Except as provided in paragraphs (b) and (c) of this section, the provisions of this subpart apply to each architectural coating manufactured on or after September 13, 1999 for sale or distribution in the United States.

(b) For any architectural coating registered under the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. Section 136, *et seq.*), the provisions of this subpart apply to any such coating manufactured on or after March 13, 2000 for sale or distribution in the United States.

(c) The provisions of this subpart do not apply to any architectural coating described in paragraphs (c)(1) through (c)(5) of this section:

(1) A coating that is manufactured for sale or distribution to architectural coating markets outside the United States; such a coating must not be sold or distributed within the United States as an architectural coating.

(2) A coating that is manufactured prior to September 13, 1999.

(3) A coating that is sold in a nonrefillable aerosol container.

(4) A coating that is collected and redistributed at a paint exchange.

(5) A coating that is sold in a container with a volume of one liter or less.

### § 59.401 Definitions.

*Act* means the Clean Air Act (42 U.S.C. 7401, *et seq.*, as amended by Pub. L. 101–549, 104 Stat. 2399).

*Adhesive* means any chemical substance that is applied for the purpose of bonding two surfaces together other than by mechanical means. Under this subpart, adhesives are not considered coatings.

*Administrator* means the Administrator of the United States Environmental Protection Agency (U.S. EPA) or an authorized representative.

*Antenna coating* means a coating formulated and recommended for application to equipment and associated structural appurtenances that are used to receive or transmit electromagnetic signals.

*Anti-fouling coating* means a coating formulated and recommended for application to submerged stationary structures and their appurtenances to prevent or reduce the attachment of marine or freshwater biological organisms, including, but not limited to, coatings registered with the EPA under the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. Section 136, *et seq.*) and nontoxic foul-release coatings.

*Anti-graffiti coating* means a clear or opaque high performance coating formulated and recommended for application to interior and exterior walls, doors, partitions, fences, signs, and murals to deter adhesion of graffiti and to resist repeated scrubbing and exposure to harsh solvents, cleansers, or scouring agents used to remove graffiti.

*Appurtenance* means any accessory to a stationary structure, whether installed or detached at the proximate site of installation, including but not limited to: bathroom and kitchen fixtures; cabinets; concrete forms; doors; elevators; fences; hand railings; heating equipment, air conditioning equipment, and other fixed mechanical equipment or stationary tools; lamp posts; partitions; pipes and piping systems; rain gutters and downspouts; stairways, fixed ladders, catwalks, and fire escapes; and window screens.

*Architectural coating* means a coating recommended for field application to stationary structures and their appurtenances, to portable buildings, to pavements, or to curbs. This definition excludes adhesives and coatings recommended by the manufacturer or importer solely for shop applications or solely for application to non-stationary structures, such as airplanes, ships, boats, and railcars.

*Below-ground wood preservative* means a coating that is formulated and recommended to protect below-ground wood from decay or insect attack and that is registered with the EPA under the Federal Insecticide, Fungicide, and

Rodenticide Act (7 U.S.C. Section 136, *et seq.*).

*Bituminous coating and mastic* means a coating or mastic formulated and recommended for roofing, pavement sealing, or waterproofing that incorporates bitumens. Bitumens are black or brown materials including, but not limited to, asphalt, tar, pitch, and asphaltite that are soluble in carbon disulfide, consist mainly of hydrocarbons, and are obtained from natural deposits of asphalt or as residues from the distillation of crude petroleum or coal.

*Bond breaker* means a coating formulated and recommended for application between layers of concrete to prevent a freshly poured top layer of concrete from bonding to the layer over which it is poured.

*Calcimine recoater* means a flat solventborne coating formulated and recommended specifically for recoating calcimine-painted ceilings and other calcimine-painted substrates.

*Chalkboard resurfacer* means a coating formulated and recommended for application to chalkboards to restore a suitable surface for writing with chalk.

*Clear* means allowing light to pass through, so that the substrate may be distinctly seen.

*Coating* means a material applied onto or impregnated into a substrate for protective, decorative, or functional purposes. Such materials include, but are not limited to, paints, varnishes, sealants, inks, maskants, and temporary coatings. Protective, decorative, or functional materials that consist only of solvents, acids, bases, or any combination of these substances are not considered coatings for the purposes of this subpart.

*Colorant* means a concentrated pigment dispersion of water, solvent, and/or binder that is added to an architectural coating in a paint store or at the site of application to produce the desired color.

*Concrete curing compound* means a coating formulated and recommended for application to freshly placed concrete to retard the evaporation of water.

*Concrete curing and sealing compound* means a liquid membrane-forming compound marketed and sold solely for application to concrete surfaces to reduce the loss of water during the hardening process and to seal old and new concrete providing resistance against alkalis, acids, and ultraviolet light, and provide adhesion promotion qualities. The coating must meet the requirements of American Society for Testing and Materials (ASTM) C 1315–95, Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete (incorporated by reference—see § 59.412 of this subpart).

*Concrete protective coating* means a high-build coating, formulated and recommended, for application in a single coat over concrete, plaster, or other cementitious surfaces. These coatings are formulated to be primerless, one-coat systems that can be applied over form oils and/or uncured concrete. These coatings prevent spalling of concrete in freezing temperatures by providing long-term protection from water and chloride ion intrusion.

*Concrete surface retarder* means a mixture of retarding ingredients such as extender pigments, primary pigments, resin, and solvent that interact chemically with the cement to prevent hardening on the surface where the retarder is applied, allowing the retarded mix of cement and sand at the surface to be washed away to create an exposed aggregate finish.

*Container* means the individual receptacle that holds the coating for storage and/or sale or distribution.

*Conversion varnish* means a clear acid curing coating with an alkyd or other resin blended with amino resins and supplied as a single component or two-component product. Conversion varnishes produce a hard, durable, clear finish designed for professional application to wood flooring. The film formation is the result of an acid-catalyzed condensation reaction, affecting a transetherification at the reactive ethers of the amino resins.

*Dry fog coating* means a coating formulated and recommended only for spray application such that overspray droplets dry before subsequent contact with incidental surfaces in the vicinity of the surface coating activity.

*Exempt compounds* means specific organic compounds that are not considered volatile organic compounds (VOC)

due to negligible photochemical reactivity. The exempt compounds are specified in 40 CFR 51.100.

*Exterior coating* means an architectural coating formulated and recommended for use in conditions exposed to the weather.

*Extreme high durability coating* means an air dry coating, including a fluoropolymer-based coating, that is formulated and recommended for touchup of precoated architectural aluminum extrusions and panels and to ensure the protection of architectural subsections, and that meets the weathering requirements of American Architectural Manufacturer's Association (AAMA) specification 605–98, Voluntary Specification Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels, Section 7.9 (incorporated by reference—see § 59.412 of this subpart).

*Faux-finishing/glazing* means a coating used for wet-in-wet techniques, such as faux woodgrain, faux marble, and simulated aging, which require the finish to remain wet for an extended period of time.

*Fire-retardant/resistive coating* means a coating formulated and recommended to retard ignition and flame spread, or to delay melting or structural weakening due to high heat, that has been fire tested and rated by a certified laboratory for use in bringing buildings and construction materials into compliance with Federal, State, and local building code requirements.

*Flat coating* means a coating that is not defined under any other definition in this section and that registers gloss less than 15 on an 85-degree meter or less than 5 on a 60-degree meter according to ASTM Method D 523–89, Standard Test Method for Specular Gloss (incorporated by reference—see § 59.412 of this subpart).

*Floor coating* means an opaque coating with a high degree of abrasion resistance that is formulated and recommended for application to flooring including, but not limited to, decks, porches, and steps in a residential setting.

*Flow coating* means a coating that is used by electric power companies or their subcontractors to maintain the protective coating systems present on utility transformer units.

*Form release compound* means a coating formulated and recommended for application to a concrete form to prevent the freshly placed concrete from bonding to the form. The form may consist of wood, metal, or some material other than concrete.

*Graphic arts coating* or *sign paint* means a coating formulated and recommended for hand-application by artists using brush or roller techniques to indoor or outdoor signs (excluding structural components) and murals including lettering enamels, poster colors, copy blockers, and bulletin enamels.

*Heat reactive coating* means a high performance phenolic-based coating requiring a minimum temperature of 191 °C (375 °F) to 204 °C (400 °F) to obtain complete polymerization or cure. These coatings are formulated and recommended for commercial and industrial use to protect substrates from degradation and maintain product purity in which one or more of the following extreme conditions exist:

(1) Continuous or repeated immersion exposure of 90 to 98 percent sulfuric acid, or oleum;

(2) Continuous or repeated immersion exposure to strong organic solvents;

(3) Continuous or repeated immersion exposure to petroleum processing at high temperatures and pressures; and

(4) Continuous or repeated immersion exposure to food or pharmaceutical products which may or may not require high temperature sterilization.

*High temperature coating* means a high performance coating formulated and recommended for application to substrates exposed continuously or intermittently to temperatures above 202°C (400°F).

*Impacted immersion coating* means a high performance maintenance coating formulated and recommended for application to steel structures subject to immersion in turbulent, debris-laden water. These coatings are specifically resistant to high-energy impact damage caused by floating ice or debris.

*Imported* means that a coating manufactured outside the United States has been brought into the United States for sale or distribution.

*Importer* means a person that brings architectural coatings into the United States for sale or distribution within the United States. This definition does not include any person that brings a coating into the United States and repackages the coating by transferring it from one container to another, provided the coating VOC content is not altered and the coating is not sold or distributed to another party. For purposes of applying this definition, divisions of a company, subsidiaries, and parent companies are considered to be a single importer.

*Industrial maintenance coating* means a high performance architectural coating, including primers, sealers, undercoaters, intermediate coats, and topcoats formulated and recommended for application to substrates exposed to one or more of the following extreme environmental conditions in an industrial, commercial, or institutional setting:

(1) Immersion in water, wastewater, or chemical solutions (aqueous and nonaqueous solutions), or chronic exposure of interior surfaces to moisture condensation;

(2) Acute or chronic exposure to corrosive, caustic, or acidic agents, or to chemicals, chemical fumes, or chemical mixtures or solutions;

(3) Repeated exposure to temperatures above 120 °C (250 °F);

(4) Repeated (frequent) heavy abrasion, including mechanical wear and repeated (frequent) scrubbing with industrial solvents, cleansers, or scouring agents; or

(5) Exterior exposure of metal structures and structural components.

*Interior clear wood sealer* means a low viscosity coating formulated and recommended for sealing and preparing porous wood by penetrating the wood and creating a uniform smooth substrate for a finish coat of paint or varnish.

*Interior coating* means an architectural coating formulated and recommended for use in conditions not exposed to natural weathering.

*Label* means any written, printed, or graphic matter affixed to, applied to, attached to, blown into, formed, molded into, embossed on, or appearing upon any architectural coating container for purposes of branding, identifying, or giving information with respect to the product, use of the product, or contents of the container.

*Lacquer* means a clear or pigmented wood finish, including clear lacquer sanding sealers, formulated with cellulosic or synthetic resins to dry by evaporation without chemical reaction and to provide a solid, protective film. Lacquer stains are considered stains, not lacquers.

*Low solids* means containing 0.12 kilogram or less of solids per liter (1 pound or less of solids per gallon) of coating material and for which at least half of the volatile component is water.

*Magnesite cement coating* means a coating formulated and recommended for application to magnesite cement decking to protect the magnesite cement substrate from erosion by water.

*Manufactured* means that coating ingredients have been combined and put into containers that have been labeled and made available for sale or distribution.

*Manufacturer* means a person that produces, packages, or repackages architectural coatings for sale or distribution in the United States. A person that repackages architectural coatings as part of a paint exchange, and does not produce, package, or repackage any other architectural coatings for sale or distribution in the United States, is excluded from this definition. A person that repackages a coating by transferring it from one container to another is excluded from this definition, provided the coating VOC content is not altered and the coating is not sold or distributed to another party. For purposes of applying this definition, divisions of a company, subsidiaries, and parent companies are considered to be a single manufacturer.

*Mastic texture coating* means a coating formulated and recommended to cover holes and minor cracks and to conceal surface irregularities, and is applied in a single coat of at least 10 mils (0.010 inch) dry film thickness.

*Megagram* means one million grams or 1.102 tons.

*Metallic pigmented coating* means a nonbituminous coating containing at least 0.048 kilogram of metallic pigment per liter of coating (0.4 pound per

gallon) including, but not limited to, zinc pigment.

*Multi-colored coating* means a coating that is packaged in a single container and exhibits more than one color when applied.

*Nonferrous ornamental metal lacquers and surface protectant* means a clear coating formulated and recommended for application to ornamental architectural metal substrates (bronze, stainless steel, copper, brass, and anodized aluminum) to prevent oxidation, corrosion, and surface degradation.

*Nonflat coating* means a coating that is not defined under any other definition in this section and that registers a gloss of 15 or greater on an 85-degree meter or 5 or greater on a 60-degree meter according to ASTM Method D 523–89, Standard Test Method for Specular Gloss (incorporated by reference—see § 59.412 of this subpart).

*Nuclear coating* means a protective coating formulated and recommended to seal porous surfaces such as steel (or concrete) that otherwise would be subject to intrusion by radioactive materials. These coatings must be resistant to long-term (service life) cumulative radiation exposure (ASTM Method D 4082–89, Standard Test Method for Effects of Gamma Radiation on Coatings for Use in Light-Water Nuclear Power Plants (incorporated by reference—see § 59.412 of this subpart)), relatively easy to decontaminate, and resistant to various chemicals to which the coatings are likely to be exposed (ASTM Method D 3912–80 (Reapproved 1989), Standard Test Method for Chemical Resistance of Coatings Used in Light-Water Nuclear Power Plants (incorporated by reference—see § 59.412 of this subpart)).

*Opaque* means not allowing light to pass through, so that the substrate is concealed from view.

*Paint exchange* means a program in which consumers, excluding architectural coating manufacturers and importers, may drop off and pick up usable post-consumer architectural coatings in order to reduce hazardous waste.

*Person* means an individual, corporation, partnership, association, State municipality, political subdivision of a State, and any agency, department, or instrumentality of the United States and any officer, agent, or employee thereof.

*Pigmented* means containing finely ground insoluble powder used to provide one or more of the following properties: color; corrosion inhibition; conductivity; fouling resistance; opacity; or improved mechanical properties.

*Post-consumer coating* means an architectural coating that has previously been purchased by a consumer or distributed to a consumer but not applied, and reenters the marketplace to be purchased by or distributed to a consumer. Post-consumer coatings include, but are not limited to, coatings collected during hazardous waste collection programs for repackaging or blending with virgin coating materials.

*Pretreatment wash primer* means a primer that contains a minimum of 0.5 percent acid, by weight, that is formulated and recommended for application directly to bare metal surfaces in thin films to provide corrosion resistance and to promote adhesion of subsequent topcoats.

*Primer* means a coating formulated and recommended for application to a substrate to provide a firm bond between the substrate and subsequent coatings.

*Quick-dry enamel* means a nonflat coating that has the following characteristics:

(1) Is capable of being applied directly from the container under normal conditions with ambient temperatures between 16 and 27°C (60 and 80°F);

(2) When tested in accordance with ASTM Method D 1640–83 (Reapproved 1989), Standard Test Methods for Drying, Curing, or Film Formation of Organic Coatings at Room Temperature (incorporated by reference—see § 59.412), sets to touch in 2 hours or less, is tack free in 4 hours or less, and dries hard in 8 hours or less by the mechanical test method; and

(3) Has a dried film gloss of 70 or above on a 60 degree meter.

*Quick-dry primer, sealer, and undercoater* means a primer, sealer, or undercoater that is dry to the touch in a ½ hour and can be recoated in 2 hours when tested in accordance with ASTM Method D 1640–83 (Reapproved 1989), Standard Test Methods for Drying, Curing, or Film Formation of Organic

Coatings at Room Temperature (incorporated by reference—see § 59.412 of this subpart).

*Recycled coating* means an architectural coating that contains some portion of post-consumer coating. Recycled architectural coatings include, but are not limited to, post-consumer coatings that have been repackaged or blended with virgin coating materials.

*Repackage* means to transfer an architectural coating from one container to another.

*Repair and maintenance thermoplastic coating* means an industrial maintenance coating that has vinyl or chlorinated rubber as a primary resin and is recommended solely for the repair of existing vinyl or chlorinated rubber coatings without the full removal of the existing coating system.

*Roof coating* means a coating formulated and recommended for application to exterior roofs for the primary purpose of preventing penetration of the substrate by water or reflecting heat and reflecting ultraviolet radiation. This does not include thermoplastic rubber coatings.

*Rust preventative coating* means a coating formulated and recommended for use in preventing the corrosion of ferrous metal surfaces in residential situations.

*Sanding sealer* means a clear wood coating formulated and recommended for application to bare wood to seal the wood and to provide a coat that can be sanded to create a smooth surface. A sanding sealer that also meets the definition of a lacquer is not included in this category, but is included in the lacquer category.

*Sealer* means a coating formulated and recommended for application to a substrate for one or more of the following purposes: to prevent subsequent coatings from being absorbed by the substrate; to prevent harm to subsequent coatings by materials in the substrate; to block stains, odors, or efflorescence; to seal fire, smoke, or water damage; or to condition chalky surfaces.

*Semitransparent* means not completely concealing the surface of a substrate or its natural texture or grain pattern.

*Shellac* means a clear or pigmented coating formulated with natural resins (except nitrocellulose resins) soluble in alcohol (including, but not limited to, the resinous secretions of the lac beetle, *Laciffer lacca*). Shellacs dry by evaporation without chemical reaction and provide a quick-drying, solid protective film that may be used for blocking stains.

*Shop application* means that a coating is applied to a product or a component of a product in a factory, shop, or other structure as part of a manufacturing, production, or repairing process (e.g., original equipment manufacturing coatings).

*Stain* means a coating that produces a dry film with minimal coloring. This includes lacquer stains.

*Stain controller* means a conditioner or pretreatment coating formulated and recommended for application to wood prior to the application of a stain in order to prevent uneven penetration of the stain.

*Swimming pool coating* means a coating formulated and recommended to coat the interior of swimming pools and to resist swimming pool chemicals.

*Thermoplastic rubber coating and mastic* means a coating or mastic formulated and recommended for application to roofing or other structural surfaces and that incorporates no less than 40 percent by weight of thermoplastic rubbers in the total resin solids and may also contain other ingredients including, but not limited to, fillers, pigments, and modifying resins.

*Tint base* means a coating to which colorant is added in a paint store or at the site of application to produce a desired color.

*Traffic marking coating* means a coating formulated and recommended for marking and striping streets, highways, or other traffic surfaces including, but not limited to, curbs, berms, driveways, parking lots, sidewalks, and airport runways.

*Undercoater* means a coating formulated and recommended to provide a smooth surface for subsequent coatings.

*United States* means the United States of America, including the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands,

Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands.

*Varnish* means a clear or semi-transparent coating, excluding lacquers and shellacs, formulated and recommended to provide a durable, solid, protective film. Varnishes may contain small amounts of pigment to color a surface, or to control the final sheen or gloss of the finish.

*Volatile organic compound* or *VOC* means any organic compound that participates in atmospheric photochemical reactions, that is, any organic compound other than those which the Administrator designates as having negligible photochemical reactivity. For a list of compounds that the Administrator has designated as having negligible photochemical reactivity, also referred to as exempt compounds, refer to 40 CFR 51.100(s).

*VOC content* means the weight of VOC per volume of coating, calculated according to the procedures in § 59.406(a) of this subpart.

*Waterproofing sealer and treatment* means a coating formulated and recommended for application to a porous substrate for the primary purpose of preventing the penetration of water.

*Wood preservative* means a coating formulated and recommended to protect exposed wood from decay or insect attack, registered with the EPA under the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. Section 136, *et seq.*).

*Zone marking coating* means a coating formulated and recommended for marking and striping driveways, parking lots, sidewalks, curbs, or airport runways, and sold or distributed in a container with a volume of 19 liters (5 gallons) or less.

[63 FR 48877, Sept. 11, 1998; 64 FR 35001, June 30, 1999]

### § 59.402 VOC content limits.

(a) Each manufacturer and importer of any architectural coating subject to this subpart shall ensure that the VOC content of the coating does not exceed the applicable limit in table 1 of this subpart, except as provided in §§ 59.403 and 59.404 of this subpart. Compliance with the VOC content limits will be determined based on the VOC content, as expressed in metric units.

(b) Except as provided in paragraph (c) of this section, if anywhere on the container of any architectural coating, or any label or sticker affixed to the container, or in any sales, advertising, or technical literature supplied by a manufacturer or importer or anyone acting on their behalf, any representation is made that indicates that the coating meets the definition of more than one of the coating categories listed in table 1 of this subpart, then the most restrictive VOC content limit shall apply.

(c) The provision in paragraph (b) of this section does not apply to the coatings described in paragraphs (c)(1) through (c)(15) of this section.

(1) High temperature coatings that also meet the definition for metallic pigmented coatings are subject only to the VOC content limit in table 1 of this subpart for high temperature coatings.

(2) Lacquer coatings (including lacquer sanding sealers) that are also recommended for use in other architectural coating applications to wood, except as stains, are subject only to the VOC content limit in table 1 of this subpart for lacquers.

(3) Metallic pigmented coatings that also meet the definition for roof coatings, industrial maintenance coatings, or primers are subject only to the VOC content limit in table 1 of this subpart for metallic pigmented coatings.

(4) Shellacs that also meet the definition for any other architectural coating are subject only to the VOC content limit in table 1 of this subpart for shellacs.

(5) Fire-retardant/resistive coatings that also meet the definition for any other architectural coating are subject only to the VOC content limit in table 1 of this subpart for fire-retardant/resistive coatings.

(6) Pretreatment wash primers that also meet the definition for primers or that meet the definition for industrial maintenance coatings are subject only to the VOC content limit in table 1 of this subpart for pretreatment wash primers.

(7) Industrial maintenance coatings that also meet the definition for primers, sealers, undercoaters, or mastic

texture coatings are subject only to the VOC content limit in table 1 of this subpart for industrial maintenance coatings.

(8) Varnishes and conversion varnishes that also meet the definition for floor coatings are subject only to the VOC content limit in table 1 of this subpart for varnishes and conversion varnishes, respectively.

(9) Anti-graffiti coatings, high temperature coatings, impacted immersion coatings, thermoplastic rubber coatings and mastics, repair and maintenance thermoplastic coatings, and flow coatings that also meet the definition for industrial maintenance coatings are subject only to the VOC content limit in table 1 of this subpart for their respective categories (i.e., they are not subject to the industrial maintenance coatings VOC content limit in table 1 of this subpart).

(10) Waterproofing sealers and treatments that also meet the definition for quick-dry sealers are subject only to the VOC content limit in table 1 of this subpart for waterproofing sealers and treatments.

(11) Sanding sealers that also meet the definition for quick-dry sealers are subject only to the VOC content limit in table 1 of this subpart for sanding sealers.

(12) Nonferrous ornamental metal lacquers and surface protectants that also meet the definition for lacquers are subject only to the VOC content limit in table 1 of this subpart for nonferrous ornamental metal lacquers and surface protectants.

(13) Quick-dry primers, sealers, and undercoaters that also meet the definition for primers, sealers, or undercoaters are subject only to the VOC content limit in table 1 of this subpart for quick-dry primers, sealers, and undercoaters.

(14) Antenna coatings that also meet the definition for industrial maintenance coatings or primers are subject only to the VOC content limit in table 1 of this subpart for antenna coatings.

(15) Bituminous coatings and mastics that also meet the definition for any other architectural coatings are subject only to the VOC content limit in table 1 of this subpart for bituminous coatings and mastics.

(16) Zone marking coatings that also meet the definition for traffic marking coatings are subject only to the VOC content limit in table 1 of this subpart for zone marking coatings.

(17) Rust preventative coatings that also meet the definition for primers or undercoaters are subject only to the VOC content limit in table 1 of this subpart for rust preventative coatings.

[63 FR 48877, Sept. 11, 1998; 64 FR 35001, June 30, 1999]

### § 59.403 Exceedance fees.

(a) Except as provided in § 59.404 of this subpart, each manufacturer and importer of any architectural coating subject to the provisions of this subpart may exceed the applicable VOC content limit in table 1 of this subpart for the coating if the manufacturer or importer pays an annual exceedance fee. The exceedance fee must be calculated using the procedures in paragraphs (b) and (c) of this section.

(b) The exceedance fee paid by a manufacturer or importer, which is equal to the sum of the applicable exceedance fees for all coatings, must be calculated using equation 1 as follows:

$$\text{Annual Exceedance Fee} = \sum_{c=1}^{n} \text{Coating Fee}_c \qquad (1)$$

Where:

Annual Exceedance Fee=The total annual exceedance fee for a manufacturer or importer, in dollars.

Coating $\text{Fee}_c$=The annual exceedance fee for each coating (c), for which a fee applies, in dollars.

n=number of coatings to which a fee applies.

(c) The exceedance fee to be paid for each coating must be determined using equation 2 as follows:

$$\text{Coating Fee}_c = \text{Fee Rate} \times \text{Excess VOC} \times \text{Volume Manufactured or Imported} \quad (2)$$

Where:

Fee Rate = The rate of $0.0028 per gram of excess VOC.

Excess VOC = The VOC content of the coating, or adjusted VOC content of a recycled coating (if applicable), in grams of VOC per liter of coating, minus the applicable VOC content limit from table 1 of this subpart (that is, VOC content of the coating minus VOC content limit).

Volume Manufactured or Imported = The volume of the coating manufactured or imported per year, in liters, including the volume of any water and exempt compounds and excluding the volume of any colorant added to tint bases. Any volume for which a tonnage exemption is claimed under § 59.404 of this subpart is also excluded.

(d) The exceedance fee shall be submitted to EPA by March 1 following the calendar year in which the coatings are manufactured or imported and shall be sent to the address provided in § 59.409(b).

[63 FR 48877, Sept. 11, 1998; 64 FR 35001, June 30, 1999, as amended at 65 FR 7737, Feb. 16, 2000]

### § 59.404 Tonnage exemption.

(a) Each manufacturer and importer of any architectural coating subject to the provisions of this subpart may designate a limited quantity of coatings to be exempt from the VOC content limits in table 1 of this subpart and the exceedance fee provisions of § 59.403 of this subpart, provided all of the requirements in paragraphs (a)(1) through (a)(4) of this section are met.

(1) The total amount of VOC contained in all the coatings selected for exemption must be equal to or less than 23 megagrams (25 tons) for the period of time from September 13, 1999 through December 31, 2000; 18 megagrams (20 tons) in the year 2001; and 9 megagams (10 tons) per year in the year 2002 and each subsequent year. The amount of VOC contained in each coating shall be calculated using the procedure in paragraph (b) of this section. Compliance with the tonnage exemption will be determined based on the amount of VOC, as expressed in metric units.

(2) The container labeling requirements of § 59.405 of this subpart.

(3) The recordkeeping requirements of § 59.407(c) of this subpart.

(4) The reporting requirements of § 59.408(b) and (e) of this subpart.

(b) Each manufacturer and importer choosing to use the exemption described in paragraph (a) of this section must use equations 3 and 4 to calculate the total amount of VOC for each time period the exemption is elected. The VOC amount shall be determined without colorant that is added after the tint base is manufactured or imported.

$$\text{Total VOC} = \sum_{c=1}^{n} \text{VOC}_c \quad (3)$$

Where:

Total VOC = Total megagrams of VOC contained in all coatings being claimed under the exemption.

$\text{VOC}_c$ = Megagrams of VOC, for each coating (c) claimed under the exemption, as computed by equation 4.

n = Number of coatings for which exemption is claimed.

$$\text{VOC}_c = (\text{Volume Manufactured or Imported}) * (\text{VOC Amount}) / 1 \times 10^6 \quad (4)$$

Where:

Volume Manufactured or Imported = Volume of the coating manufactured or imported, in liters, including the volume of any water and exempt compounds and excluding the volume of any colorant added to tint bases, for the time period the exemption is claimed.

VOC Amount = Grams of VOC per liter of coating thinned to the manufacturer's maximum recommendation, including the volume of any water and exempt compounds.

[63 FR 48877, Sept. 11, 1998; 64 FR 35001, June 30, 1999]

**§ 59.405 Container labeling requirements.**

(a) Each manufacturer and importer of any architectural coating subject to the provisions of this subpart shall provide the information listed in paragraphs (a)(1) through (a)(3) of this section on the coating container in which the coating is sold or distributed.

(1) The date the coating was manufactured, or a date code representing the date shall be indicated on the label, lid, or bottom of the container.

(2) A statement of the manufacturer's recommendation regarding thinning of the coating shall be indicated on the label or lid of the container. This requirement does not apply to the thinning of architectural coatings with water. If thinning of the coating prior to use is not necessary, the recommendation must specify that the coating is to be applied without thinning.

(3) The VOC content of the coating as described in paragraph (a)(3)(i) or (a)(3)(ii) of this section shall be indicated on the label or lid of the container.

(i) The VOC content of the coating, displayed in units of grams of VOC per liter of coating or in units of pounds of VOC per gallon of coating; or

(ii) The VOC content limit in table 1 of this subpart with which the coating is required to comply and does comply, displayed in units of grams of VOC per liter of coating or in units of pounds of VOC per gallon of coating.

(b) In addition to the information specified in paragraph (a) of this section, each manufacturer and importer of any industrial maintenance coating subject to the provisions of this subpart shall display on the label or lid of the container in which the coating is sold or distributed one or more of the descriptions listed in paragraphs (b)(1) through (b)(4) of this section.

(1) ''For industrial use only.''

(2) ''For professional use only.''

(3) ''Not for residential use'' or ''Not intended for residential use.''

(4) ''This coating is intended for use under the following condition(s):'' (Include each condition in paragraphs (b)(4)(i) through (b)(4)(v) of this section that applies to the coating.)

(i) Immersion in water, wastewater, or chemical solutions (aqueous and nonaqueous solutions), or chronic exposure of interior surfaces to moisture condensation;

(ii) Acute or chronic exposure to corrosive, caustic, or acidic agents, or to chemicals, chemical fumes, or chemical mixtures or solutions;

(iii) Repeated exposure to temperatures above 120° C (250° F);

(iv) Repeated (frequent) heavy abrasion, including mechanical wear and repeated (frequent) scrubbing with industrial solvents, cleansers, or scouring agents; or

(v) Exterior exposure of metal structures and structural components.

(c) In addition to the information specified in paragraph (a) of this section, each manufacturer and importer of any recycled coating who calculates the VOC content using equations 7 and 8 in § 59.406(a)(3) of this subpart shall include the following statement indicating the post-consumer coating content on the label or lid of the container in which the coating is sold or distributed: ''CONTAINS NOT LESS THAN X PERCENT BY VOLUME POST-CONSUMER COATING,'' where ''X'' is replaced by the percent by volume of post-consumer architectural coating.

[63 FR 48877, Sept. 11, 1998; 64 FR 35001, June 30, 1999]

**§ 59.406 Compliance provisions.**

(a) For the purpose of determining compliance with the VOC content limits in table 1 of this subpart, each manufacturer and importer shall determine the VOC content of a coating using the procedures described in paragraph (a)(1), (a)(2), or (a)(3) of this section, as appropriate. The VOC content of a tint base shall be determined without colorant that is added after the tint base is manufactured or imported.

(1) With the exception of low solids stains and low solids wood preservatives, determine the VOC content in grams of VOC per liter of coating thinned to the manufacturer's maximum recommendation, excluding the volume of any water and exempt compounds. Calculate the VOC content using equation 5 as follows:

$$\text{VOC Content} = \frac{(W_s - W_w - W_{ec})}{(V_m - V_w - V_{ec})} \quad (5)$$

Where:

VOC content = grams of VOC per liter of coating

$W_s$ = weight of volatiles, in grams

$W_w$ = weight of water, in grams

$W_{ec}$ = weight of exempt compounds, in grams

$V_m$ = volume of coating, in liters

$V_w$ = volume of water, in liters

$V_{ec}$ = volume of exempt compounds, in liters

(2) For low solids stains and low solids wood preservatives, determine the VOC content in units of grams of VOC per liter of coating thinned to the manufacturer's maximum recommendation, including the volume of any water and exempt compounds. Calculate the VOC content using equation 6 as follows:

$$\text{VOC Content}_{ls} = \frac{(W_s - W_w - W_{ec})}{(V_m)} \quad (6)$$

Where:

VOC content $_{ls}$ = the VOC content of a low solids coating in grams of VOC per liter of coating

$W_s$ = weight of volatiles, in grams

$W_w$ = weight of water, in grams

$W_{ec}$ = weight of exempt compounds, in grams

$V_m$ = volume of coating, in liters

(3) For recycled coatings, the manufacturer or importer has the option of calculating an adjusted VOC content to account for the post-consumer coating content. If this option is used, the manufacturer or importer shall determine the adjusted VOC content using equations 7 and 8 as follows:

$$\text{Adjusted VOC Content} = \text{Actual VOC Content} - \left(\text{Actual VOC Content}\left(\frac{\text{Percent Post-consumer Coating}}{100}\right)\right) \quad (7)$$

Where:

Adjusted VOC content = The VOC content assigned to the recycled coating for purposes of complying with the VOC content limits in table 1 of this subpart.

Actual VOC content = The VOC content of the coating as determined using equation 5 in paragraph (a)(1) of this section.

Percent Post-consumer Coating = The volume percent of a recycled coating that is post-consumer coating materials (as determined in equation 8)

$$\text{Percent Post-consumer Coating} = \frac{\text{Volume of Post-consumer Coating}}{(\text{Volume of Post-consumer Coating} + \text{Volume of Virgin Materials})} \times 100 \text{ Percent} \quad (8)$$

Where:

Percent Post-consumer Coating = The volume percent of a recycled coating that is post-consumer coating materials.

Volume of Post-consumer Coating = The volume, in liters, of post-consumer coating materials used in the production of a recycled coating.

Volume of Virgin Materials = The volume, in liters, of virgin coating materials used in the production of a recycled coating.

(b) To determine the composition of a coating in order to perform the calculations in paragraph (a) of this section, the reference method for VOC content is Method 24 of appendix A of 40 CFR part 60, except as provided in paragraphs (c) and (d) of this section. To determine the VOC content of a coating, the manufacturer or importer may use Method 24 of appendix A of 40 CFR part 60, an alternative method as provided in paragraph (c) of this section, formulation data, or any other reasonable means for predicting that the coating has been formulated as intended (e.g., quality assurance checks, recordkeeping). However, if there are any inconsistencies between the results of a Method 24 test and any other means for determining VOC content, the Method 24 test results will govern, except as provided in paragraph (c) of this section. The Administrator may

require the manufacturer or importer to conduct a Method 24 analysis.

(c) The Administrator may approve, on a case-by-case basis, a manufacturer's or importer's use of an alternative method in lieu of Method 24 for determining the VOC content of coatings if the alternative method is demonstrated to the Administrator's satisfaction to provide results that are acceptable for purposes of determining compliance with this subpart.

(d) Analysis of methacrylate multicomponent coatings used as traffic marking coatings shall be conducted according to the procedures specified in appendix A to this subpart. Appendix A to this subpart is a modification of Method 24 of appendix A of 40 CFR part 60. The modification of Method 24 provided in appendix A to this subpart has not been approved for methacrylate multicomponent coatings used for other purposes than as traffic marking coatings or for other classes of multicomponent coatings.

(e) The Administrator may determine a manufacturer's or importer's compliance with the provisions of this subpart based on information required by this subpart (including the records and reports required by §§ 59.407 and 59.408 of this subpart) or any other information available to the Administrator.

### § 59.407 Recordkeeping requirements.

(a) Each manufacturer and importer using the provisions of § 59.406(a)(3) of this subpart to determine the VOC content of a recycled coating shall maintain in written or electronic form records of the information specified in paragraphs (a)(1) through (a)(6) of this section for a period of 3 years.

(1) The minimum volume percent post-consumer coating content for each recycled coating.

(2) The volume of post-consumer coating received for recycling.

(3) The volume of post-consumer coating received that was unusable.

(4) The volume of virgin materials.

(5) The volume of the final recycled coating manufactured or imported.

(6) Calculations of the adjusted VOC content as determined using equation 7 in § 59.406(a)(3) of this subpart for each recycled coating.

(b) Each manufacturer and importer using the exceedance fee provisions in § 59.403 of this subpart, as an alternative to achieving the VOC content limits in table 1 of this subpart, shall maintain in written or electronic form the records specified in paragraphs (b)(1) through (b)(7) of this section for a period of 3 years.

(1) A list of the coatings and the associated coating categories in table 1 of this subpart for which the exceedance fee is used.

(2) Calculations of the annual fee for each coating and the total annual fee for all coatings using the procedure in § 59.403 (b) and (c) of this subpart.

(3) The VOC content of each coating in grams of VOC per liter of coating.

(4) The excess VOC content of each coating in grams of VOC per liter of coating.

(5) The total volume of each coating manufactured or imported per calendar year, in liters, including the volume of any water and exempt compounds and excluding the volume of any colorant added to tint bases.

(6) The annual fee for each coating.

(7) The total annual fee for all coatings.

(c) Each manufacturer and importer claiming the tonnage exemption in § 59.404 of this subpart shall maintain in written or electronic form the records specified in paragraphs (c)(1) through (c)(4) of this section for a period of 3 years.

(1) A list of all coatings and associated coating categories in table 1 of this subpart for which the exemption is claimed.

(2) The VOC amount as used in equation 4.

(3) The volume manufactured or imported, in liters, for each coating for which the exemption is claimed for the time period the exemption is claimed.

(4) The total megagrams of VOC contained in each coating for which the exemption is claimed, and for all coatings combined for which the exemption is claimed, for the time period the exemption is claimed, as calculated in § 59.404(b) of this subpart.

[63 FR 48877, Sept. 11, 1998; 64 FR 35001, June 30, 1999]

**§ 59.408 Reporting requirements.**

(a) Each manufacturer and importer of any architectural coating subject to the provisions of this subpart shall submit reports and exceedance fees specified in this section to the appropriate address as listed in § 59.409 of this subpart.

(b) Each manufacturer and importer of any architectural coating subject to the provisions of this subpart shall submit an initial notification report no later than the applicable compliance date specified in § 59.400, or within 180 days after the date that the first architectural coating is manufactured or imported, whichever is later. The initial report must include the information in paragraphs (b)(1) through (b)(3) of this section.

(1) The name and mailing address of the manufacturer or importer.

(2) The street address of each one of the manufacturer's or importer's facilities in the United States that is producing, packaging, or repackaging any architectural coating subject to the provisions of this subpart.

(3) A list of the categories from table 1 of this subpart for which the manufacturer's or importer's coatings meet the definitions in § 59.401 of this subpart.

(4) If a date code is used on a coating container to represent the date a coating was manufactured, as allowed in § 59.405(a)(1) of this subpart, the manufacturer or importer of the coating shall include an explanation of each date code in the initial notification report and shall submit an explanation of any new date code no later than 30 days after the new date code is first used on the container for a coating.

(c) Each manufacturer and importer of a recycled coating that chooses to determine the adjusted VOC content according to the provisions of § 59.406(a)(3) to demonstrate compliance with the applicable VOC content limit in table 1 of this subpart shall submit a report containing the information in paragraphs (c)(1) through (c)(5) of this section. The report must be submitted for each coating for which the adjusted VOC content is used to demonstrate compliance. This report must be submitted by March 1 of the year following any calendar year in which the adjusted VOC content provision is used.

(1) The minimum volume percent post-consumer coating content for each recycled coating.

(2) The volume of post-consumer coating received for recycling.

(3) The volume of post-consumer coating received that was unusable.

(4) The volume of virgin materials used.

(5) The volume of the final recycled coating manufactured or imported.

(d) Each manufacturer and importer that uses the exceedance fee provisions of § 59.403 of this subpart shall report the information in paragraphs (d)(1) through (d)(7) of this section for each coating for which the exceedance fee provisions are used. This report and the exceedance fee payment must be submitted by March 1 following the calendar year in which the coating is manufactured or imported.

(1) Manufacturer's or importer's name and mailing address.

(2) A list of all coatings and the associated coating categories in table 1 of this subpart for which the exceedance fee provision is being used.

(3) The VOC content of each coating that exceeds the applicable VOC content limit in table 1 of this subpart.

(4) The excess VOC content of each coating in grams of VOC per liter of coating.

(5) The total volume of each coating manufactured or imported per calendar year, in liters, including the volume of any water and exempt compounds and excluding the volume of any colorant added to tint bases.

(6) The annual fee for each coating.

(7) The total annual fee for all coatings.

(e) Each manufacturer and importer of architectural coatings for which a tonnage exemption under § 59.404 of this subpart is claimed shall submit a report no later than March 1 of the year following the calendar year in which the exemption was claimed. The report must include the information in paragraphs (f)(1) through (f)(4) of this section.

(1) A list of all coatings and the associated coating categories in table 1 of this subpart for which the exemption was claimed.

(2) The VOC amount as used in equation 4.

(3) The volume manufactured or imported, in liters, for each coating for which the exemption is claimed for the time period the exemption is claimed.

(4) The total megagrams of VOC contained in all coatings for which the exemption was claimed for the time period the exemption was claimed, as calculated in § 59.404(b) of this subpart.

[63 FR 48877, Sept. 11, 1998; 64 FR 35001, June 30, 1999]

### § 59.409 Addresses of EPA Offices.

(a) Except for exceedance fee payments, each manufacturer and importer of any architectural coating subject to the provisions of this subpart shall submit all requests, reports, submittals, and other communications to the Administrator pursuant to this regulation to the Regional Office of the U.S. Environmental Protection Agency that serves the State or Territory in which the corporate headquarters of the manufacturer or importer resides. These areas are indicated in the following list of EPA Regional Offices:

EPA Region I (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont), Director, Office of Environmental Stewardship, Mailcode: SAA, One Congress Street, Boston, MA 02114–2023.

EPA Region II (New Jersey, New York, Puerto Rico, Virgin Islands), Director, Division of Enforcement and Compliance Assistance, 290 Broadway, New York, NY 10007–1866.

EPA Region III (Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, West Virginia), Director, Air Protection Division, 1650 Arch Street, Philadelphia, PA 19103.

EPA Region IV (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee), Director, Air, Pesticides, and Toxics Management Division, 61 Forsyth Street, Atlanta, GA 30303.

EPA Region V (Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin), Director, Air and Radiation Division, 77 West Jackson Boulevard, Chicago, IL 60604–3507.

EPA Region VI (Arkansas, Louisiana, New Mexico, Oklahoma, Texas), Director, Multimedia Planning and Permitting Division, 1445 Ross Avenue, Dallas, TX 75202–2733.

EPA Region VII (Iowa, Kansas, Missouri, Nebraska), Director, Air, RCRA, and Toxics Division, 901 North 5th Street, Kansas City, KS 66101.

EPA Region VIII (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming), Director, Office of Partnerships and Regulatory Assistance, 999 18th Street, Suite 500, Denver, Colorado 80202–2466.

EPA Region IX (American Samoa, Arizona, California, Guam, Hawaii, Nevada), Director, Air Division, 75 Hawthorne Street, San Francisco, CA 94105.

EPA Region X (Alaska, Oregon, Idaho, Washington), Director, Office of Air Quality, 1200 Sixth Avenue, Seattle, WA 98101.

(b) Each manufacturer and importer who uses the exceedance fee provisions of § 59.403 shall submit the exceedance fee payment required by § 59.408(d) to the following address: Environmental Protection Agency, AIM Exceedance Fees, Post Office Box 371293M, Pittsburgh, PA 15251. This address is for the fee payment only; the exceedance fee report required by § 59.408(d) is to be submitted to the appropriate EPA Regional Office listed in paragraph (a) of this section. The exceedance fee payment in the form of a check or money order must be made payable to ''U.S. Environmental Protection Agency'' or ''US EPA.''

[63 FR 48877, Sept. 11, 1998; 64 FR 35001, June 30, 1999, as amended at 65 FR 7737, Feb. 16, 2000]

### § 59.410 State authority.

The provisions of this subpart must not be construed in any manner to preclude any State or political subdivision thereof from:

(a) Adopting and enforcing any emissions standard or limitation applicable to a manufacturer or importer of architectural coatings; or

(b) Requiring the manufacturer or importer of architectural coatings to obtain permits, licenses, or approvals prior to initiating construction, modification, or operation of a facility for manufacturing an architectural coating.

### § 59.411 Circumvention.

Each manufacturer and importer of any architectural coating subject to the provisions of this subpart must not alter, destroy, or falsify any record or report, to conceal what would otherwise be noncompliance with this subpart. Such concealment includes, but is not limited to, refusing to provide the Administrator access to all required

records and date-coding information, altering the VOC content of a coating batch, or altering the results of any required tests to determine VOC content.

**§ 59.412 Incorporations by reference.**

(a) The materials listed in this section are incorporated by reference in the paragraphs noted in § 59.401. These incorporations by reference were approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. These materials are incorporated as they exist on the date of the approval, and notice of any changes in these materials will be published in the FEDERAL REGISTER. The materials are available for purchase at the corresponding addresses noted below, and all are available for inspection at the Air and Radiation Docket and Information Center, U.S. EPA, 401 M St., SW., Washington, DC 20460; at the EPA Library (MD–35), U.S. EPA, Research Triangle Park, North Carolina; or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030, or go to: *http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.*

(b) The materials listed below are available for purchase at the following address: American Society for Testing and Materials (ASTM), 100 Barr Harbor Drive, West Conshohocken, PA 19428–2959.

(1) ASTM Method C 1315–95, Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete, incorporation by reference approved for § 59.401, *Concrete curing and sealing compound*.

(2) ASTM Method D 523–89, Standard Test Method for Specular Gloss, incorporation by reference approved for § 59.401, *Flat coating* and *Nonflat coating*.

(3) ASTM Method D 1640–83 (Reapproved 1989), Standard Test Methods for Drying, Curing, or Film Formation of Organic Coatings at Room Temperature, incorporation by reference approved for § 59.401, *Quick-dry enamel* and *Quick-dry primer, sealer, and undercoater*.

(4) ASTM Method D 3912–80 (Reapproved 1989), Standard Test Method for Chemical Resistance of Coatings Used in Light-Water Nuclear Power Plants, incorporation by reference approved for § 59.401, *Nuclear coating*.

(5) ASTM Method D 4082–89, Standard Test Method for Effects of Gamma Radiation on Coatings for Use in Light-Water Nuclear Power Plants, incorporation by reference approved for § 59.401, *Nuclear coating*.

(c) The following material is available from the AAMA, 1827 Walden Office Square, Suite 104, Schaumburg, IL 60173.

(1) AAMA 605–98, Voluntary Specification Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels, incorporation by reference approved for § 59.401, *Extreme high durability coating*.

(2) [Reserved]

[63 FR 48877, Sept. 11, 1998, as amended at 69 FR 18803, Apr. 9, 2004]

**§ 59.413 Availability of information and confidentiality.**

(a) *Availability of information*. The availability to the public of information provided to or otherwise obtained by the Administrator under this part shall be governed by part 2 of this chapter.

(b) *Confidentiality*. All confidential business information entitled to protection under section 114(c) of the Act that must be submitted or maintained by each manufacturer or importer of architectural coatings pursuant to this section shall be treated in accordance with 40 CFR part 2, subpart B.

## APPENDIX A TO SUBPART D OF PART 59—DETERMINATION OF VOLATILE MATTER CONTENT OF METHACRYLATE MULTICOMPONENT COATINGS USED AS TRAFFIC MARKING COATINGS

### 1.0 PRINCIPLE AND APPLICABILITY

1.1 Applicability. This modification to Method 24 of appendix A of 40 CFR part 60 applies to the determination of volatile matter content of methacrylate multicomponent coatings used as traffic marking coatings.

1.2 Principle. A known amount of methacrylate multicomponent coating is dispersed in a weighing dish using a stirring device before the volatile matter is removed by heating in an oven.

2.0 PROCEDURE

2.1 Prepare about 100 milliliters (mL) of sample by mixing the components in a storage container, such as a glass jar with a screw top or a metal can with a cap. The storage container should be just large enough to hold the mixture. Combine the components (by weight or volume) in the ratio recommended by the manufacturer. Tightly close the container between additions and during mixing to prevent loss of volatile materials. Most manufacturers' mixing instructions are by volume. Because of possible error caused by expansion of the liquid when measuring the volume, it is recommended that the components be combined by weight. When weight is used to combine the components and the manufacturer's recommended ratio is by volume, the density must be determined by section 3.5 of Method 24 of appendix A of 40 CFR part 60.

2.2 Immediately after mixing, take aliquots from this 100 mL sample for determination of the total volatile content, water content, and density. To determine water content, follow section 3.4 of Method 24 of appendix A of 40 CFR part 60. To determine density, follow section 3.5 of Method 24. To determine total volatile content, use the apparatus and reagents described in section 3.8.2 of Method 24 and the following procedures:

2.2.1 Weigh and record the weight of an aluminum foil weighing dish and a metal paper clip. Using a syringe as specified in section 3.8.2.1 of Method 24, weigh to 1 milligrams (mg), by difference, a sample of coating into the weighing dish. For methacrylate multicomponent coatings used for traffic marking use 3.0 ±0.1 g.

2.2.2 Add the specimen and use the metal paper clip to disperse the specimen over the surface of the weighing dish. If the material forms a lump that cannot be dispersed, discard the specimen and prepare a new one. Similarly, prepare a duplicate. The sample shall stand for a minimum of 1 hour, but no more than 24 hours before being oven dried at 110 ±5 degrees Celsius for 1 hour.

2.2.3 Heat the aluminum foil dishes containing the dispersed specimens in the forced draft oven for 60 minutes at 110 ±5 degrees Celsius. Caution—provide adequate ventilation, consistent with accepted laboratory practice, to prevent solvent vapors from accumulating to a dangerous level.

2.2.4 Remove the dishes from the oven, place immediately in a desiccator, cool to ambient temperature, and weigh to within 1 mg. After weighing, break up the film of the coating using the metal paper clip. Weigh dish to within 1 mg. Return to forced draft oven for an additional 60 minutes at 110 ±5 degrees Celsius.

2.2.5 Remove the dishes from the oven, place immediately in a desiccator, cool to ambient temperature, and weigh to within 1 mg.

2.2.6 Run analyses in pairs (duplicate sets for each coating mixture until the criterion in section 4.3 of Method 24 of appendix A of 40 CFR part 60 is met. Calculate the weight of volatile matter for each heating period following Equation 24–2 of Method 24 and record the arithmetic average. Add the arithmetic average for the two heating periods to obtain the weight fraction of the volatile matter.

3.0 DATA VALIDATION PROCEDURE

3.1 Follow the procedures in Section 4 of Method 24 of appendix A to 40 CFR part 60.

3.2 If more than 10 percent of the sample is lost when the sample is being broken up in 2.2.4, the sample is invalid.

4.0 CALCULATIONS

Follow the calculation procedures in Section 5 of Method 24 of appendix A of 40 CFR part 60.

TABLE 1 TO SUBPART D OF PART 59—VOLATILE ORGANIC COMPOUND (VOC), CONTENT LIMITS FOR ARCHITECTURAL COATINGS

[Unless otherwise specified, limits are expressed in grams of VOC per liter of coating thinned to the manufacturer's maximum recommendation excluding the volume of any water, exempt compounds, or colorant added to tint bases.]

| Coating category | Grams VOC per liter | Pounds VOC per gallon [a] |
|---|---|---|
| Antenna coatings | 530 | 4.4 |
| Anti-fouling coatings | 450 | 3.8 |
| Anti-graffiti coatings | 600 | 5.0 |
| Bituminous coatings and mastics | 500 | 4.2 |
| Bond breakers | 600 | 5.0 |
| Calcimine recoater | 475 | 4.0 |
| Chalkboard resurfacers | 450 | 3.8 |
| Concrete curing compounds | 350 | 2.9 |
| Concrete curing and sealing compounds | 700 | 5.8 |

[Unless otherwise specified, limits are expressed in grams of VOC per liter of coating thinned to the manufacturer's maximum recommendation excluding the volume of any water, exempt compounds, or colorant added to tint bases.]

| Coating category | Grams VOC per liter | Pounds VOC per gallon [a] |
|---|---|---|
| Concrete protective coatings | 400 | 3.3 |
| Concrete surface retarders | 780 | 6.5 |
| Conversion varnish | 725 | 6.0 |
| Dry fog coatings | 400 | 3.3 |
| Extreme high durability coatings | 800 | 6.7 |
| Faux finishing/glazing | 700 | 5.8 |
| Fire-retardant/resistive coatings: | | |
| Clear | 850 | 7.1 |
| Opaque | 450 | 3.8 |
| Flat coatings: | | |
| Exterior coatings | 250 | 2.1 |
| Interior coatings | 250 | 2.1 |
| Floor coatings | 400 | 3.3 |
| Flow coatings | 650 | 5.4 |
| Form release compounds | 450 | 3.8 |
| Graphic arts coatings (sign paints) | 500 | 4.2 |
| Heat reactive coatings | 420 | 3.5 |
| High temperature coatings | 650 | 5.4 |
| Impacted immersion coatings | 780 | 6.5 |
| Industrial maintenance coatings | 450 | 3.8 |
| Lacquers (including lacquer sanding sealers) | 680 | 5.7 |
| Magnesite cement coatings | 600 | 5.0 |
| Mastic texture coatings | 300 | 2.5 |
| Metallic pigmented coatings | 500 | 4.2 |
| Multi-colored coatings | 580 | 4.8 |
| Nonferrous ornamental metal lacquers and surface protectants | 870 | 7.3 |
| Nonflat coatings: | | |
| Exterior coatings | 380 | 3.2 |
| Interior coatings | 380 | 3.2 |
| Nuclear coatings | 450 | 3.8 |
| Pretreatment wash primers | 780 | 6.5 |
| Primers and undercoaters | 350 | 2.9 |
| Quick-dry coatings: | | |
| Enamels | 450 | 3.8 |
| Primers, sealers, and undercoaters | 450 | 3.8 |
| Repair and maintenance thermoplastic coatings | 650 | 5.4 |
| Roof coatings | 250 | 2.1 |
| Rust preventative coatings | 400 | 3.3 |
| Sanding sealers (other than lacquer sanding sealers) | 550 | 4.6 |
| Sealers (including interior clear wood sealers) | 400 | 3.3 |
| Shellacs: | | |
| Clear | 730 | 6.1 |
| Opaque | 550 | 4.6 |
| Stains: | | |
| Clear and semitransparent | 550 | 4.6 |
| Opaque | 350 | 2.9 |
| Low solids | [b] 120 | [b] 1.0 |
| Stain controllers | 720 | 6.0 |
| Swimming pool coatings | 600 | 5.0 |
| Thermoplastic rubber coatings and mastics | 550 | 4.6 |
| Traffic marking coatings | 150 | 1.3 |
| Varnishes | 450 | 3.8 |
| Waterproofing sealers and treatments | 600 | 5.0 |
| Wood preservatives: | | |
| Below ground wood preservatives | 550 | 4.6 |
| Clear and semitransparent | 550 | 4.6 |
| Opaque | 350 | 2.9 |
| Low solids | [b] 120 | [b] 1.0 |
| Zone marking coatings | 450 | 3.8 |

[a] English units are provided for information only. Compliance will be determined based on the VOC content limit, as expressed in metric units.

[b] Units are grams of VOC per liter (pounds of VOC per gallon) of coating, including water and exempt compounds, thinned to the maximum thinning recommended by the manufacturer.

[63 FR 48877, Sept. 11, 1998; 63 FR 55175, Oct. 14, 1998; 63 FR 32103, June 15, 1999; 64 FR 35002, June 30, 1999]

## Subpart E [Reserved]

## Subpart F—Control of Evaporative Emissions From New and In-Use Portable Fuel Containers

SOURCE: 72 FR 8533, Feb. 26, 2007, unless otherwise noted.

OVERVIEW AND APPLICABILITY

### § 59.600 Does this subpart apply for my products?

(a) Except as provided in § 59.605 and paragraph (b) of this section, the regulations in this subpart F apply for all portable fuel containers (defined in § 59.680) that are manufactured on or after January 1, 2009.

(b) See § 59.602 (a) and (b) to determine how to apply the provisions of this subpart for containers that were manufactured before January 1, 2009.

### § 59.601 Do the requirements of this subpart apply to me?

(a) Unless specified otherwise in this subpart, the requirements and prohibitions of this subpart apply to all manufacturers and importers of portable fuel containers. Certain prohibitions in § 59.602 apply to all other persons.

(b) New portable fuel containers that are subject to the emissions standards of this part must be covered by a certificate of conformity that is issued to the manufacturer of the container. If more than one person meets the definition of manufacturer for a portable fuel container, see § 59.621 to determine if you are the manufacturer who may apply for and receive a certificate of conformity.

(c) Unless specifically noted otherwise, the term ''you'' means manufacturers, as defined in § 59.680.

### § 59.602 What are the general prohibitions and requirements of this subpart?

(a) *General prohibition for manufacturers and importers.* No manufacturer or importer may sell, offer for sale, introduce or deliver for introduction into commerce in the United States, or import any new portable fuel container that is subject to the emissions standards of this subpart and is manufactured after December 31, 2008 unless it is covered by a valid certificate of conformity, it is labeled as required, and it complies with all of the applicable requirements of this subpart, including compliance with the emissions standards for its useful life. After June 30, 2009, no manufacturer or importer may sell, offer for sale, introduce or deliver into commerce in the United States, or import any new portable fuel container that was manufactured prior to January 1, 2009 unless it meets the requirements of this subpart.

(b) *General prohibition for wholesale distributors.* No wholesale distributor may sell, offer for sale, or distribute any portable fuel container in the United States that is subject to the emissions standards of this subpart and is manufactured after December 31, 2008 unless it is covered by a valid certificate of conformity and is labeled as required. After December 31, 2009, no wholesale distributor may sell, offer for sale, or distribute in the United States any portable fuel container that was manufactured prior to January 1, 2009 unless it meets the requirements of this subpart. After December 31, 2009, all new portable fuel containers shall be deemed to be manufactured after December 31, 2008 unless they are in retail inventory.

(c) *Reporting and recordkeeping.* (1) You must keep the records and submit the reports specified in § 59.628. Records must be retained for at least 5 years from the date of manufacture or importation and must be supplied to EPA upon request.

(2) No person may alter, destroy, or falsify any record or report required by this subpart.

(d) *Testing and access to facilities.* You may not keep us from entering your facility to observe tests or inspect facilities if we are authorized to do so. Also, you must perform the tests we require (or have the tests done for you). Failure to perform this testing is prohibited.

(e) *Warranty.* You may not fail to offer, provide notice of, or honor the emissions warranty required under this subpart.

(f) *Replacement components.* No person may sell, offer for sale, introduce or deliver for introduction into commerce in the United States, import, or install

any replacement component for portable fuel containers subject to the standards of this subpart where the component has the effect of disabling, bypassing, or rendering inoperative the emissions controls of the containers.

(g) *Violations*. If a person violates any prohibition or requirement of this subpart or the Act concerning portable fuel containers, it shall be considered a separate violation for each portable fuel container.

(h) *Assessment of penalties and injunctions*. We may assess administrative penalties, bring a civil action to assess and recover civil penalties, bring a civil action to enjoin and restrain violations, or bring criminal action as provided by the Clean Air Act.

### § 59.603 How must manufacturers apply good engineering judgment?

(a) In addition to other requirements and prohibitions set forth in this subpart, you must use good engineering judgment for decisions related to any requirements under this subpart. This includes your applications for certification, any testing you do to show that your portable fuel containers comply with requirements that apply to them, and how you select, categorize, determine, and apply these requirements.

(b) Upon request, you must provide EPA a written description of the engineering judgment in question. Such information must be provided within 15 working days unless EPA specifies a different period of time to respond.

(c) We may reject your decision if it is not based on good engineering judgment or is otherwise inconsistent with the requirements that apply, and we may—

(1) Suspend, revoke, or void a certificate of conformity if we determine you used incorrect or incomplete information or failed to consider relevant information, or that your decision was not based on good engineering judgment; or

(2) Notify you that we believe any aspect of your application or other information submission may be incorrect or invalid due to lack of good engineering judgment or other cause. Unless a different period is specified, you will have 30 days to respond to our notice and specifically address our concerns. After considering your information, we will notify you regarding our finding, which may include the actions provided in paragraph (c)(1) of this section.

(d) If you disagree with our conclusions under paragraph (c) of this section, you may file a request for a hearing with the Designated Compliance Officer as described in § 59.699. In your request, you must specifically state your objections, and include relevant data or supporting analysis. The request must be signed by your authorized representative. If we agree that your request raises a substantial factual issue, we will hold the hearing according to § 59.699.

### § 59.605 What portable fuel containers are excluded from this subpart's requirements?

This section describes exclusions that apply to certain portable fuel containers. The prohibitions and requirements of this subpart do not apply for containers excluded under this section. Exclusions under this section are based on inherent characteristics of the containers. See § 59.660 for exemptions that apply based on special circumstances.

(a) Containers approved as safety cans consistent with the requirements of 29 CFR 1926.150 through 1926.152 are excluded. Such cans generally have a flash-arresting screens, spring-closing lids and spout covers and have been approved by a nationally recognized testing laboratory such as Factory Mutual Engineering Corp. or Underwriters Laboratories, Inc., or Federal agencies such as Bureau of Mines, or U.S. Coast Guard.

(b) Containers with a nominal capacity of less than 0.25 gallons or more than 10.0 gallons are excluded.

(c) Containers designed and marketed solely to deliver fuel directly to nonroad engines during engine operation, such as containers with a connection for a fuel line and a reserve fuel area, are considered to be nonroad fuel tanks, and are thus excluded.

### § 59.607 Submission of information.

(a) You are responsible for all statements you make to us related to this subpart F, including information not required during certification. You are

required to provide truthful and complete information. This subpart describes the consequences of failing to meet this obligation. The consequences also may include prosecution under 18 U.S.C. 1001 and 42 U.S.C. 7431(c)(2).

(b) We may require an officer or authorized representative of your company with knowledge of the information contained in the submittal to approve and sign any submission of information to us, and to certify that all the information submitted is accurate and complete.

EMISSION STANDARDS AND RELATED REQUIREMENTS

### § 59.611 What evaporative emission requirements apply under this subpart?

(a) Hydrocarbon emissions from portable fuel containers may not exceed 0.3 grams per gallon per day when measured with the test procedures in §§ 59.650 through 59.653. This procedure measures diurnal venting emissions and permeation emissions.

(b) For the purpose of this section, portable fuel containers include spouts, caps, gaskets, and other parts provided with the container.

(c) The following general requirements also apply for all portable fuel containers subject to the standards of this subpart:

(1) *Prohibited controls.* The following controls are prohibited:

(i) For anyone to design, manufacture, or install emission control systems so they cause or contribute to an unreasonable risk to public health, welfare, or safety while operating.

(ii) For anyone to design, manufacture, or install emission control systems with features that disable, deactivate, reduce effectiveness, or bypass the emission controls, either actively or passively. For example, you may not include a manual vent that the operator can open to bypass emission controls. You may ask us to allow such features if needed for safety reasons or if the features operate during emission tests described in subpart F of this part.

(2) *Leaks.* You must design and manufacture your containers to be free of leaks. This requirement applies when your container is upright, partially inverted, or completely inverted.

(3) *Refueling.* You are required to design your portable fuel containers to minimize spillage during refueling to the extent practical. This requires that you use good engineering judgment to avoid designs that will make it difficult to refuel typical vehicle and equipment designs without spillage.

(d) Portable fuel containers must meet the standards and requirements specified in this subpart throughout the useful life of the container. The useful life of the container is five years beginning on the date of sale to the ultimate purchaser.

### § 59.612 What emission-related warranty requirements apply to me?

(a) *General requirements.* You must warrant to the ultimate purchaser that the new portable fuel container, including all parts of its evaporative emission-control system, is:

(1) Designed, built, and equipped so it conforms at the time of sale to the ultimate purchaser with the requirements of this subpart.

(2) Is free from defects in materials and workmanship that may keep it from meeting these requirements.

(b) *Warranty notice and period.* Your emission-related warranty must be valid for a minimum of one year from the date of sale to the ultimate purchaser.

(c) *Notice.* You must provide a warranty notice with each container.

### § 59.613 What operation and maintenance instructions must I give to buyers?

You must provide the ultimate purchaser of the new portable fuel container written instructions for properly maintaining and using the emission-control system.

### § 59.615 How must I label and identify the portable fuel containers I produce?

This section describes how you must label your portable fuel containers.

(a) At the time of manufacture, indelibly mark the month and year of manufacture on each container.

(b) Mold into or affix a legible label identifying each portable fuel container. The label must be:

(1) Attached so it is not easily removable.

(2) Secured to a part of the container that can be easily viewed when the can is in use, not on the bottom of the container.

(3) Written in English.

(c) The label must include:

(1) The heading ''EMISSION CONTROL INFORMATION''.

(2) Your full corporate name, trademark and warranty contact information.

(3) A standardized identifier such as EPA's standardized designation for the emission families, the model number, or the part number.

(4) This statement: ''THIS CONTAINER COMPLIES WITH U.S. EPA EMISSION REGULATIONS FOR PORTABLE FUEL CONTAINERS (40 CFR Part 59).''.

(5) This statement: ''THE EMISSIONS WARRANTY IS VALID FOR A MINIMUM OF ONE YEAR FROM DATE OF PURCHASE.''.

(d) You may add information to the emission control information label to identify other emission standards that the container meets or does not meet (such as California standards). You may also add other information to ensure that the portable fuel container will be properly maintained and used.

(e) You may request that we approve modified labeling requirements in this subpart F if you show that it is necessary or appropriate. We will approve your request if your alternate label is consistent with the requirements of this subpart.

(f) You may identify the name and trademark of another company instead of their own on your emission control information label, subject to the following provisions:

(1) You must have a contractual agreement with the other company that obligates that company to take the following steps:

(i) Meet the emission warranty requirements that apply under § 59.612. This may involve a separate agreement involving reimbursement of warranty-related expenses.

(ii) Report all warranty-related information to the certificate holder.

(2) In your application for certification, identify the company whose trademark you will use and describe the arrangements you have made to meet your requirements under this section.

(3) You remain responsible for meeting all the requirements of this subpart.

CERTIFYING EMISSION FAMILIES

### § 59.621 Who may apply for a certificate of conformity?

A certificate of conformity may be issued only to the manufacturer that completes the construction of the portable fuel container. In unusual circumstances, upon a petition by a manufacturer, we may allow another manufacturer of the container to hold the certificate of conformity. However, in order to hold the certificate, the manufacturer must demonstrate day-to-day ability to ensure that containers produced under the certificate will comply with the requirements of this subpart.

### § 59.622 What are the general requirements for obtaining a certificate of conformity and producing portable fuel containers under it?

(a) You must send us a separate application for a certificate of conformity for each emission family. A certificate of conformity for containers is valid from the indicated effective date until the end of the production period for which it is issued. We may require new certification prior to the end of the production period if we finds that containers are not meeting the standards in use during their useful life.

(b) The application must be written in English and contain all the information required by this subpart and must not include false or incomplete statements or information (see §§ 59.607 and 59.629).

(c) We may ask you to include less information than we specify in this subpart, as long as you maintain all the information required by § 59.628.

(d) You must use good engineering judgment for all decisions related to your application (see § 59.603).

(e) An authorized representative of your company must approve and sign the application.

(f) See § 59.629 for provisions describing how we will process your application.

(g) If we approve your application, we will issue a certificate that will allow you to produce the containers that you described in your application for a specified production period. Certificates do not allow you to produce containers that were not described in your application, unless we approve the additional containers under § 59.624.

### § 59.623 What must I include in my application?

This section specifies the information that must be in your application, unless we ask you to include less information under § 59.622(c). We may require you to provide additional information to evaluate your application.

(a) Describe the emission family's specifications and other basic parameters of the emission controls. List each distinguishable configuration in the emission family. Include descriptions and part numbers for all detachable components such as spouts and caps.

(b) Describe and explain the method of emission control.

(c) Describe the products you selected for testing and the reasons for selecting them.

(d) Describe the test equipment and procedures that you used, including any special or alternate test procedures you used (see § 59.650).

(e) List the specifications of the test fuel to show that it falls within the required ranges specified in § 59.650.

(f) Include the maintenance and use instructions and warranty information you will give to the ultimate purchaser of each new portable fuel container (see § 59.613).

(g) Describe your emission control information label (see § 59.615).

(h) State that your product was tested as described in the application (including the test procedures, test parameters, and test fuels) to show you meet the requirements of this subpart.

(i) Present emission data to show your products meet the applicable emission standards. Where applicable, §§ 59.626 and 59.627 may allow you to submit an application in certain cases without new emission data.

(j) Report all test results, including those from invalid tests or from any other tests, whether or not they were conducted according to the test procedures of §§ 59.650 through 59.653. We may ask you to send other information to confirm that your tests were valid under the requirements of this subpart.

(k) Unconditionally certify that all the products in the emission family comply with the requirements of this subpart, other referenced parts of the CFR, and the Clean Air Act.

(l) Include estimates of U.S.-directed production volumes.

(m) Include the information required by other sections of this subpart.

(n) Include other relevant information, including any additional information requested by EPA.

(o) Name an agent for service located in the United States. Service on this agent constitutes service on you or any of your officers or employees for any action by EPA or otherwise by the United States related to the requirements of this subpart.

### § 59.624 How do I amend my application for certification?

Before we issue you a certificate of conformity, you may amend your application to include new or modified configurations, subject to the provisions of this section. After we have issued your certificate of conformity, you may send us an amended application requesting that we include new or modified configurations within the scope of the certificate, subject to the provisions of this section. You must amend your application if any changes occur with respect to any information included in your application.

(a) You must amend your application before you take either of the following actions:

(1) Add a configuration to an emission family. In this case, the configuration added must be consistent with other configurations in the emission family with respect to the criteria listed in § 59.625.

(2) Change a configuration already included in an emission family in a way that may affect emissions, or change any of the components you described in your application for certification. This includes production and

design changes that may affect emissions any time during the portable fuel containers' lifetime.

(b) To amend your application for certification, send the Designated Compliance Officer the following information:

(1) Describe in detail the addition or change in the configuration you intend to make.

(2) Include engineering evaluations or data showing that the amended emission family complies with all applicable requirements. You may do this by showing that the original emission data are still appropriate with respect to showing compliance of the amended family with all applicable requirements.

(3) If the original emission data for the emission family are not appropriate to show compliance for the new or modified configuration, include new test data showing that the new or modified configuration meets the requirements of this subpart.

(c) We may ask for more test data or engineering evaluations. You must give us these within 30 days after we request them.

(d) For emission families already covered by a certificate of conformity, we will determine whether the existing certificate of conformity covers your new or modified configuration. You may ask for a hearing if we deny your request (see § 59.699).

(e) For emission families already covered by a certificate of conformity and you send us a request to amend your application, you may sell and distribute the new or modified configuration before we make a decision under paragraph (d) of this section, subject to the provisions of this paragraph. If we determine that the affected configurations do not meet applicable requirements, we will notify you to cease production of the configurations and any containers from the new or modified configuration will not be considered covered by the certificate. In addition, we may require you to recall any affected containers that you have already distributed, including those sold to the ultimate purchasers. Choosing to produce containers under this paragraph (e) is deemed to be consent to recall all containers that we determine do not meet applicable emission standards or other requirements and to remedy the nonconformity at no expense to the owner. If you do not provide information required under paragraph (c) of this section within 30 days, you must stop producing the new or modified containers.

### § 59.625 How do I select emission families?

(a) Divide your product line into families of portable fuel containers that are expected to have similar emission characteristics throughout the useful life.

(b) Group containers in the same emission family if they are the same in all the following aspects:

(1) Type of material (including pigments, plasticizers, UV inhibitors, or other additives that may affect control of emissions).

(2) Production method.

(3) Spout and cap design.

(4) Gasket material and design.

(5) Emission control strategy.

(c) You may subdivide a group of containers that is identical under paragraph (b) of this section into different emission families if you show the expected emission characteristics are different.

(d) You may group containers that are not identical with respect to the things listed in paragraph (b) of this section in the same emission family if you show that their emission characteristics will be similar throughout their useful life.

### § 59.626 What emission testing must I perform for my application for a certificate of conformity?

This section describes the emission testing you must perform to show compliance with the emission standards in § 59.611.

(a) Test your products using the procedures and equipment specified in §§ 59.650 through 59.653.

(b) Select an emission-data unit from each emission family for testing. You must test a production sample or a preproduction product that will represent actual production. Select the configuration that is most likely to exceed (or have emissions nearest to) the

applicable emission standard. For example, for a family of multilayer portable fuel containers, test the container with the thinnest barrier layer. Test three identical containers.

(c) We may measure emissions from any of your products from the emission family. You must supply your products to us if we choose to perform confirmatory testing.

(d) You may ask to use emission data from a previous production period (carryover) instead of doing new tests, but only if the emission-data from the previous production period remains the appropriate emission-data unit under paragraph (b) of this section. For example, you may not carryover emission data for your family of containers if you have added a thinner-walled container than was tested previously.

(e) We may require you to test a second unit of the same or different configuration in addition to the unit tested under paragraph (b) of this section.

(f) If you use an alternate test procedure under § 59.652 and later testing shows that such testing does not produce results that are equivalent to the procedures specified in this subpart, we may reject data you generated using the alternate procedure and base our compliance determination on the later testing.

### § 59.627 How do I demonstrate that my emission family complies with evaporative emission standards?

(a) For purposes of certification, your emission family is considered in compliance with an evaporative emission standard in § 59.611(a) if the test results from all portable fuel containers in the family that have been tested show measured emissions levels that are at or below the applicable standard.

(b) Your emissions family is deemed not to comply if any container representing that family has test results showing an official emission level above the standard.

(c) Round the measured emission level to the same number of decimal places as the emission standard. Compare the rounded emission levels to the emission standard.

### § 59.628 What records must I keep and what reports must I send to EPA?

(a) Organize and maintain the following records:

(1) A copy of all applications and any other information you send us.

(2) Any of the information we specify in § 59.623 that you were not required to include in your application.

(3) A detailed history of each emission-data unit. For each emission-data unit, include all of the following:

(i) The emission-data unit's construction, including its origin and buildup, steps you took to ensure that it represents production containers, any components you built specially for it, and all the components you include in your application for certification.

(ii) All your emission tests, including documentation on routine and standard tests, as specified in §§ 59.650 through 59.653, and the date and purpose of each test.

(iii) All tests to diagnose emission-control performance, giving the date and time of each and the reasons for the test.

(iv) Any other relevant events or information.

(4) Production figures for each emission family divided by assembly plant.

(5) If you identify your portable fuel containers by lot number or other identification numbers, keep a record of these numbers for all the containers you produce under each certificate of conformity.

(b) Keep data from routine emission tests (such as test cell temperatures and relative humidity readings) for one year after we issue the associated certificate of conformity. Keep all other information specified in paragraph (a) of this section for five years after we issue your certificate.

(c) Store these records in any format and on any media, as long as you can promptly send us organized, written records in English if we ask for them. You must keep these records readily available. We may review them at any time.

(d) Send us copies of any maintenance instructions or explanations if we ask for them.

(e) Send us an annual warranty report summarizing successful warranty claims by emission family under

§ 59.612, including the reason for the claim. You must submit the report by July 1 for the preceding calendar year.

### § 59.629 What decisions may EPA make regarding my certificate of conformity?

(a) If we determine your application is complete and shows that the emission family meets all the requirements of this subpart and the Act, we will issue a certificate of conformity for your emission family for the specified production period. We may make the approval subject to additional conditions.

(b) We may deny your application for certification if we determine that your emission family fails to comply with emission standards or other requirements of this subpart or the Act. Our decision may be based on a review of all information available to us. If we deny your application, we will explain why in writing.

(c) In addition, we may deny your application or suspend, revoke, or void your certificate if you do any of the following:

(1) Refuse to comply with any testing or reporting requirements.

(2) Submit false or incomplete information.

(3) Render inaccurate any test data.

(4) Deny us from completing authorized activities (see § 59.698). This includes a failure to provide reasonable assistance.

(5) Produce portable fuel containers for importation into the United States at a location where local law prohibits us from carrying out authorized activities.

(6) Fail to supply requested information or amend your application to include all portable fuel containers being produced.

(7) Take any action that otherwise circumvents the intent of the Act or this subpart.

(d) If we deny your application or suspend, revoke, or void your certificate, you may ask for a hearing (see § 59.699).

### § 59.630 EPA testing.

We may test any portable fuel container subject to the standards of this subpart.

(a) *Certification and production sample testing.* Upon our request, a manufacturer must supply a prototype container or a reasonable number of production samples to us for verification testing. These samples will generally be tested using the full test procedure of § 59.653.

(b) *In-use testing.* We may test in-use containers using the test procedure of § 59.653 without preconditioning.

### § 59.650 General testing provisions.

(a) The test procedures of this subpart are addressed to you as a manufacturer, but they apply equally to anyone who does testing for you.

(b) Unless we specify otherwise, the terms ''procedures'' and ''test procedures'' in this subpart include all aspects of testing, including the equipment specifications, calibrations, calculations, and other protocols and procedural specifications needed to measure emissions.

(c) The specification for gasoline to be used for testing is given in 40 CFR 1065.710. Use the grade of gasoline specified for general testing. Blend this grade of gasoline with reagent grade ethanol in a volumetric ratio of 90.0 percent gasoline to 10.0 percent ethanol. You may use ethanol that is less pure if you can demonstrate that it will not affect your ability to demonstrate compliance with the applicable emission standards.

(d) Accuracy and precision of all temperature measurements must be ±2.2 °C or better.

(e) Accuracy and precision of mass balances must be sufficient to ensure accuracy and precision of two percent or better for emission measurements for products at the maximum level allowed by the standard. The readability of the display may not be coarser than half of the required accuracy and precision.

### § 59.652 Other procedures.

(a) *Your testing.* The procedures in this subpart apply for all testing you do to show compliance with emission standards, with certain exceptions listed in this section.

(b) *Our testing.* These procedures generally apply for testing that we do to

determine if your portable fuel containers complies with applicable emission standards. We may perform other testing as allowed by the Act.

(c) *Exceptions.* We may allow or require you to use procedures other than those specified in this subpart as follows:

(1) You may request to use special procedures if your portable fuel containers cannot be tested using the specified procedures. We will approve your request if we determine that it would produce emission measurements that represent in-use operation and we determine that it can be used to show compliance with the requirements of § 59.611.

(2) You may ask to use emission data collected using other procedures, such as those of the California Air Resources Board. We will approve this only if you show us that using these other procedures do not affect your ability to show compliance with the applicable emission standards. This generally requires emission levels to be far enough below the applicable emission standards so that any test differences do not affect your ability to state unconditionally that your containers will meet all applicable emission standards when tested using the specified test procedures.

(3) You may request to use alternate procedures that are equivalent to allowed procedures, or more accurate or more precise than allowed procedures.

(4) You may not use other procedures under this paragraph (c) until we approve your request.

### § 59.653 How do I test portable fuel containers?

You must test the portable fuel container as described in your application, with the applicable spout attached except as otherwise noted. Tighten fittings in a manner representative of how they would be tightened by a typical user.

(a) *Preconditioning for durability.* Complete the following steps before an emissions test, in any order, unless we determine that omission of one or more of these durability steps will not affect the emissions from your container.

(1) *Pressure cycling.* Perform a pressure test by sealing the container and cycling it between +13.8 and −1.7 kPa (+2.0 and −0.5 psig) for 10,000 cycles at a rate of 60 seconds per cycle. For this test, the spout may be removed and the pressure applied through the opening where the spout attaches. The purpose of this test is to represent environmental wall stresses caused by pressure changes and other factors (such as vibration or thermal expansion). If your container cannot be tested using the pressure cycles specified by this paragraph (a)(1), you may ask to use special test procedures under § 59.652(c).

(2) *UV exposure.* Perform a sunlight-exposure test by exposing the container to an ultraviolet light of at least 24 W/m$^2$ (0.40 W-hr/m$^2$/min) on the container surface for at least 450 hours. Alternatively, the container may be exposed to direct natural sunlight for an equivalent period of time, as long as you ensure that the container is exposed to at least 450 daylight hours.

(3) *Slosh testing.* Perform a slosh test by filling the portable fuel container to 40 percent of its capacity with the fuel specified in paragraph (e) of this section and rocking it at a rate of 15 cycles per minute until you reach one million total cycles. Use an angle deviation of +15° to −15° from level.

(4) *Spout actuation.* Perform the following spout actuation and inversion steps at the end on the slosh testing, and at the end of the preconditioning soak.

(i) Perform one complete actuation/inversion cycle per day for ten days.

(ii) One actuation/inversion cycle consists of the following steps:

(A) Remove and replace the spout to simulate filling the container.

(B) Slowly invert the container and keep it inverted for at least 5 seconds to ensure that the spout and mechanisms become saturated with fuel. Any fuel leaking from any part of the container will denote a leak and must be reported as part of certification. Once completed, place the container on a flat surface in the upright position.

(C) Actuate the spout by fully opening and closing without dispensing fuel. The spout must return to the closed position without the aid of the operator (e.g., pushing or pulling the spout closed). Repeat for a total of 10 actuations. If at any point the spout

fails to return to the closed position, the container fails the test.

(D) Repeat the step contained in paragraph (a)(4)(ii)(B) of this section (i.e., the inversion step).

(E) Repeat the steps contained in paragraph (a)(4)(ii)(C) of this section (i.e., ten actuations).

(b) *Preconditioning fuel soak*. Complete the following steps before a diurnal emission test:

(1) Fill the portable fuel container with the specified fuel to its nominal capacity, seal it using the spout, and allow it to soak at 28 ±5 °C for 20 weeks. Alternatively, the container may be soaked for 10 weeks at 43 ±5 °C. You may count the time of the preconditioning steps in paragraph (a) of this section as part of the preconditioning fuel soak, as long as the ambient temperature remains within the specified temperature range and the fuel tank is at least 40 percent full; you may add or replace fuel as needed to conduct the specified durability procedures.

(2) Pour the fuel out of the container and immediately refill to 50 percent of nominal capacity. Be careful to not spill any fuel on the container. Wipe the outside of the container as needed to remove any liquid fuel that may have spilled on it.

(3) Install the spout assembly that will be used in the production containers. The spout and other openings (such as vents) on the container must be tested in their open condition unless they close automatically and are unlikely to be left open by the user during typical storage. All manual closures such as caps must be left off the container and spout during testing.

(c) *Reference container*. A reference container is required to correct for buoyancy effects that may occur during testing. Prepare the reference tank as follows:

(1) Obtain a second container of the same model as the test tank. You may not use a container that has previously contained fuel or any other contents that might affect the stability of its mass.

(2) Fill the reference container with enough dry sand (or other inert material) so that the mass of the reference container is approximately the same as the test container when filled with fuel. Use good engineering judgment to determine how similar the mass of the reference container needs to be to the mass of the test container considering the performance characteristics of your balance.

(3) Ensure that the sand (or other inert material) is dry. This may require heating the container or applying a vacuum to it.

(4) Seal the container.

(d) *Diurnal test run*. To run the test, take the following steps for a portable fuel container that was preconditioned as specified in paragraph (a) of this section.

(1) Stabilize the fuel temperature within the portable fuel container at 22.2 °C. Vent the container at this point to relieve any positive or negative pressure that may have developed during stabilization.

(2) Weigh the sealed reference container and record the weight. Place the reference on the balance and tare it so that it reads zero. Place the sealed test container on the balance and record the difference between the test container and the reference container. This value is $M_{initial}$ Take this measurement within 8 hours of filling the test container with fuel as specified in paragraph (b)(2) of this section.

(3) Immediately place the portable fuel container within a well ventilated, temperature-controlled room or enclosure. Do not spill or add any fuel.

(4) Close the room or enclosure.

(5) Follow the temperature profile in the following table for all portable fuel containers. Use good engineering judgment to follow this profile as closely as possible. You may use linearly interpolated temperatures or a spline fit for temperatures between the hourly setpoints.

TABLE 1 OF § 59.653—DIURNAL TEMPERATURE PROFILE FOR PORTABLE FUEL CONTAINERS

| Time (hours) | Ambient Temperature (°C) Profile |
|---|---|
| 0 | 22.2 |
| 1 | 22.5 |
| 2 | 24.2 |
| 3 | 26.8 |
| 4 | 29.6 |
| 5 | 31.9 |
| 6 | 33.9 |

TABLE 1 OF § 59.653—DIURNAL TEMPERATURE PROFILE FOR PORTABLE FUEL CONTAINERS—Continued

| Time (hours) | Ambient Temperature (°C) Profile |
|---|---|
| 7 | 35.1 |
| 8 | 35.4 |
| 9 | 35.6 |
| 10 | 35.3 |
| 11 | 34.5 |
| 12 | 33.2 |
| 13 | 31.4 |
| 14 | 29.7 |
| 15 | 28.2 |
| 16 | 27.2 |
| 17 | 26.1 |
| 18 | 25.1 |
| 19 | 24.3 |
| 20 | 23.7 |
| 21 | 23.3 |
| 22 | 22.9 |
| 23 | 22.6 |
| 24 | 22.2 |

(6) At the end of the diurnal period, retare the balance using the reference container and weigh the portable fuel container. Record the difference in mass between the reference container and the test. This value is $M_{final}$.

(7) Subtract $M_{final}$ from $M_{initial}$ and divide the difference by the nominal capacity of the container (using at least three significant figures) to calculate the g/gallon/day emission rate as follows:

Emission rate = ($M_{initial}$—$M_{final}$)/(nominal capacity)/(one day)

(8) Round your result to the same number of decimal places as the emission standard.

(9) Instead of determining emissions by weighing the container before and after the diurnal temperature cycle, you may place the container in a SHED meeting the specifications of 40 CFR 86.107–96(a)(1) and measure emissions directly. Immediately following the stabilization in paragraph (d)(1) of this section, purge the SHED and follow the temperature profile from paragraph (d)(4) of this section. Start measuring emissions when you start the temperature profile and stop measuring emissions when the temperature profile concludes.

(e) For metal containers, you may demonstrate for certification that your portable fuel containers comply with the evaporative emission standards without performing the pre-soak or container durability cycles (i.e., the pressure cycling, UV exposure, and slosh testing) specified in this section. For other containers, you may demonstrate compliance without performing the durability cycles specified in this section only if we approve it after you have presented data clearly demonstrating that the cycle or cycles do not negatively impact the permeation rate of the materials used in the containers.

SPECIAL COMPLIANCE PROVISIONS

### § 59.660 Exemption from the standards.

In certain circumstances, we may exempt portable fuel containers from the evaporative emission standards and requirements of § 59.611 and the prohibitions and requirements of § 59.602. You do not need an exemption for any containers that you own but do not sell, offer for sale, introduce or deliver for introduction into U.S. commerce, or import into the United States. Submit your request for an exemption to the Designated Compliance Officer.

(a) Portable fuel containers that are intended for export only and are in fact exported are exempt provided they are clearly labeled as being for export only. Keep records for five years of all portable fuel containers that you manufacture for export. Any introduction into U.S. commerce of such portable fuel containers for any purpose other than export is considered to be a violation of § 59.602 by the manufacturer. You do not need to request this exemption.

(b) You may ask us to exempt portable fuel containers that you will purchase, sell, or distribute for the sole purpose of testing them.

(c) You may ask us to exempt portable fuel containers for the purpose of national security, as long as your request is endorsed by an agency of the federal government responsible for national defense. In your request, explain why you need the exemption.

(d) You may ask us to exempt containers that are designed and marketed solely for rapidly refueling racing applications which are designed to create a leak proof seal with the target tank

or are designed to connect with a receiver installed on the target tank. This exemption is generally intended for containers used to rapidly refuel a race car during a pit stop and similar containers. In your request, explain how why these containers are unlikely to be used for nonracing applications. We may limit these exemptions to those applications that are allowed to use gasoline exempted under 40 CFR 80.200(a).

(e) EPA may impose reasonable conditions on any exemption, including a limit on the number of containers that are covered by an exemption.

### § 59.662 What temporary provisions address hardship due to unusual circumstances?

(a) After considering the circumstances, we may exempt you from the evaporative emission standards and requirements of § 59.611 of this subpart and the prohibitions and requirements of § 59.602 for specified portable fuel containers that do not comply with emission standards if all the following conditions apply:

(1) Unusual circumstances that are clearly outside your control and that could not have been avoided with reasonable discretion prevent you from meeting requirements from this subpart.

(2) You exercised prudent planning and were not able to avoid the violation; you have taken all reasonable steps to minimize the extent of the nonconformity.

(3) Not having the exemption will jeopardize the solvency of your company.

(4) No other allowances are available under the regulations in this chapter to avoid the impending violation, including the provisions of § 59.663.

(b) To apply for an exemption, you must send the Designated Compliance Officer a written request as soon as possible before you are in violation. In your request, show that you meet all the conditions and requirements in paragraph (a) of this section.

(c) Include in your request a plan showing how you will meet all the applicable requirements as quickly as possible.

(d) You must give us other relevant information if we ask for it.

(e) We may include reasonable additional conditions on an approval granted under this section, including provisions to recover or otherwise address the lost environmental benefit or paying fees to offset any economic gain resulting from the exemption.

(f) We may approve renewable extensions of up to one year. We may review and revise an extension as reasonable under the circumstances.

(g) Add a legible label, written in English, to a readily visible part of each container exempted under this section. This label must prominently include at least the following items:

(1) Your corporate name and trademark.

(2) The statement ''EXEMPT UNDER 40 CFR 59.662.''.

### § 59.663 What are the provisions for extending compliance deadlines for manufacturers under hardship?

(a) After considering the circumstances, we may extend the compliance deadline for you to meet new emission standards, as long as you meet all the conditions and requirements in this section.

(b) To apply for an extension, you must send the Designated Compliance Officer a written request. In your request, show that all the following conditions and requirements apply:

(1) You have taken all possible business, technical, and economic steps to comply.

(2) Show that the burden of compliance costs prevents you from meeting the requirements of this subpart by the required compliance date.

(3) Not having the exemption will jeopardize the solvency of your company.

(4) No other allowances are available under the regulations in this subpart to avoid the impending violation.

(c) In describing the steps you have taken to comply under paragraph (b)(1) of this section, include at least the following information:

(1) Describe your business plan, showing the range of projects active or under consideration.

(2) Describe your current and projected financial standing, with and

without the burden of complying in full with the applicable regulations in this subpart by the required compliance date.

(3) Describe your efforts to raise capital to comply with regulations in this subpart.

(4) Identify the engineering and technical steps you have taken or plan to take to comply with regulations in this subpart.

(5) Identify the level of compliance you can achieve. For example, you may be able to produce containers that meet a somewhat less stringent emission standard than the regulations in this subpart require.

(d) Include in your request a plan showing how you will meet all the applicable requirements as quickly as possible.

(e) You must give us other relevant information if we ask for it.

(f) An authorized representative of your company must sign the request and include the statement: ''All the information in this request is true and accurate, to the best of my knowledge.''.

(g) Send your request for this extension at least nine months before the relevant deadline.

(h) We may include reasonable requirements on an approval granted under this section, including provisions to recover or otherwise address the lost environmental benefit. For example, we may require that you meet a less stringent emission standard.

(i) We may approve renewable extensions of up to one year. We may review and revise an extension as reasonable under the circumstances.

(j) Add a permanent, legible label, written in English, to a readily visible part of each container exempted under this section. This label must prominently include at least the following items:

(1) Your corporate name and trademark.

(2) The statement ''EXEMPT UNDER 40 CFR 59.663.''.

### § 59.664 What are the requirements for importing portable fuel containers into the United States?

As specified in this section, we may require you to post a bond if you import into the United States containers that are subject to the standards of this subpart. See paragraph (f) of this section for the requirements related to importing containers that have been certified by someone else.

(a) Prior to importing containers into the U.S., we may require you to post a bond to cover any potential compliance or enforcement actions under the Clean Air Act if you cannot demonstrate to us that you have assets of an appropriate liquidity readily available in the United States with a value equal to the retail value of the containers that you will import during the calendar year.

(b) We may set the value of the bond up to five dollars per container.

(c) You may meet the bond requirements of this section by obtaining a bond from a third-party surety that is cited in the U.S. Department of Treasury Circular 570, ''Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies'' (*http://www.fms.treas.gov/c570/c570.html#certified*).

(d) If you forfeit some or all of your bond in an enforcement action, you must post any appropriate bond for continuing importation within 90 days after you forfeit the bond amount.

(e) You will forfeit the proceeds of the bond posted under this section if you need to satisfy any United States administrative final order or judicial judgment against you arising from your conduct in violation of this subpart.

(f) This paragraph (f) applies if you import for resale containers that have been certified by someone else. You and the certificate holder are each responsible for compliance with the requirements of this subpart and the Clean Air Act. No bond is required under this section if either you or the certificate holder meet the conditions in paragraph (a) of this section. Otherwise, the importer must comply with the bond requirements of this section.

DEFINITIONS AND OTHER REFERENCE INFORMATION

### § 59.680 What definitions apply to this subpart?

The following definitions apply to this subpart. The definitions apply to all subparts unless we note otherwise. All undefined terms have the meaning the Act gives to them. The definitions follow:

*Act* means the Clean Air Act, as amended, 42 U.S.C. 7401–7671q.

*Adjustable parameter* means any device, system, or element of design that someone can adjust and that, if adjusted, may affect emissions. You may ask us to exclude a parameter if you show us that it will not be adjusted in use in a way that affects emissions.

*Certification* means relating to the process of obtaining a certificate of conformity for an emission family that complies with the emission standards and requirements in this subpart.

*Configuration* means a unique combination of hardware (material, geometry, and size) and calibration within an emission family. Units within a single configuration differ only with respect to normal production variability.

*Container* means portable fuel container.

*Designated Compliance Officer* means the Manager, Engine Programs Group (6403–J), U.S. Environmental Protection Agency, 1200 Pennsylvania Ave., NW., Washington, DC 20460.

*Designated Enforcement Officer* means the Director, Air Enforcement Division (2242A), U.S. Environmental Protection Agency, 1200 Pennsylvania Ave., NW.,Washington, DC 20460.

*Emission-control system* means any device, system, or element of design that controls or reduces the regulated evaporative emissions from.

*Emission-data unit* means a portable fuel container that is tested for certification. This includes components tested by EPA.

*Emission-related maintenance* means maintenance that substantially affects emissions or is likely to substantially affect emission deterioration.

*Emission family* has the meaning given in § 59.625.

*Evaporative* means relating to fuel emissions that result from permeation of fuel through the portable fuel container materials and from ventilation of the container.

*Good engineering judgment* means judgments made consistent with generally accepted scientific and engineering principles and all available relevant information. See § 59.603 for the administrative process we use to evaluate good engineering judgment.

*Hydrocarbon (HC)* means total hydrocarbon (THC).

*Manufacture* means the physical and engineering process of designing and/or constructing a portable fuel container.

*Manufacturer* means any person who manufactures a portable fuel container for sale in the United States.

*Nominal capacity* means the expected volumetric working capacity of a container.

*Official emission result* means the measured emission rate for an emission-data unit.

*Portable fuel container* means any reusable container designed and marketed (or otherwise intended) for use by consumers for receiving, transporting, storing, and dispensing gasoline, diesel fuel, or kerosene. For the purpose of this subpart, all utility jugs that are red, yellow or blue in color are deemed to be portable fuel containers, regardless of how they are labeled or marketed.

*Production period* means the period in which a portable fuel container will be produced under a certificate of conformity. The maximum production period is five years.

*Revoke* means to terminate the certificate or an exemption for an emission family. If we revoke a certificate or exemption, you must apply for a new certificate or exemption before continuing to introduce the affected containers into commerce. This does not apply to containers you no longer possess.

*Round* has the meaning given in 40 CFR 1065.1001.

*Suspend* means to temporarily discontinue the certificate or an exemption for an emission family. If we suspend a certificate, you may not introduce into commerce portable fuel containers from that emission family unless we reinstate the certificate or approve a new one. If we suspend an exemption, you may not introduce into commerce containers that were previously covered by the exemption unless we reinstate the exemption.

*Total hydrocarbon* means the combined mass of organic compounds measured by the specified procedure for measuring total hydrocarbon, expressed as a hydrocarbon with a hydrogen-to-carbon mass ratio of 1.85:1.

*Ultimate purchaser* means, with respect to any portable fuel container, the first person who in good faith purchases such a container for purposes other than resale.

*Ultraviolet light* means electromagnetic radiation with a wavelength between 300 and 400 nanometers.

*United States* means the States, the District of Columbia, the Commonwealth of Puerto Rico, the Commonwealth of the Northern Mariana Islands, Guam, American Samoa, and the U.S. Virgin Islands.

*U.S.-directed production volume* means the amount of portable fuel containers, subject to the requirements of this subpart, produced by a manufacturer for which the manufacturer has a reasonable assurance that sale was or will be made to ultimate purchasers in the United States.

*Useful life* means the period during which a portable fuel container is required to comply with all applicable emission standards. See § 59.611.

*Void* means to invalidate a certificate or an exemption *ab initio* (i.e. retroactively). Portable fuel containers introduced into U.S. commerce under the voided certificate or exemption is a violation of this subpart, whether or not they were introduced before the certificate or exemption was voided.

*We (us, our)* means the Administrator of the Environmental Protection Agency and any authorized representatives.

### § 59.685 What symbols, acronyms, and abbreviations does this subpart use?

The following symbols, acronyms, and abbreviations apply to this subpart:

CFR Code of Federal Regulations
EPA Environmental Protection Agency
HC hydrocarbon
NIST National Institute of Standards and Technology
THC total hydrocarbon
U.S.C. United States Code

### § 59.695 What provisions apply to confidential information?

(a) Clearly show what you consider confidential by marking, circling, bracketing, stamping, or some other method.

(b) We will store your confidential information as described in 40 CFR part 2. Also, we will disclose it only as specified in 40 CFR part 2. This applies both to any information you send us and to any information we collect from inspections, audits, or other site visits.

(c) If you send us a second copy without the confidential information, we will assume it contains nothing confidential whenever we need to release information from it.

(d) If you send us information without claiming it is confidential, we may make it available to the public without further notice to you, as described in 40 CFR 2.204.

### § 59.697 State actions.

The provisions in this subpart do not preclude any State or any political subdivision of a State from:

(a) Adopting and enforcing any emission standard or limitation applicable to anyone subject to the provisions of this part; or

(b) Requiring the regulated entity to obtain permits, licenses, or approvals prior to initiating construction, modification, or operation of a facility for manufacturing a consumer product.

### § 59.698 May EPA enter my facilities for inspections?

(a) We may inspect your portable fuel containers, testing, manufacturing processes, storage facilities (including port facilities for imported containers

or other relevant facilities), or records, as authorized by the Act, to enforce the provisions of this subpart. Inspectors will have authorizing credentials and will limit inspections to reasonable times—usually, normal operating hours.

(b) If we come to inspect, we may or may not have a warrant or court order.

(1) If we do not have a warrant or court order, you may deny us entry.

(2) If we have a warrant or court order, you must allow us to enter the facility and carry out the activities it describes.

(c) We may seek a warrant or court order authorizing an inspection described in this section, whether or not we first tried to get your permission to inspect.

(d) We may select any facility to do any of the following:

(1) Inspect and monitor any aspect of portable fuel container manufacturing, assembly, storage, or other procedures, and any facilities where you do them.

(2) Inspect and monitor any aspect of test procedures or test-related activities, including test container selection, preparation, durability cycles, and maintenance and verification of your test equipment's calibration.

(3) Inspect and copy records or documents related to assembling, storing, selecting, and testing a container.

(4) Inspect and photograph any part or aspect of containers or components use for assembly.

(e) You must give us reasonable help without charge during an inspection authorized by the Act. For example, you may need to help us arrange an inspection with the facility's managers, including clerical support, copying, and translation. You may also need to show us how the facility operates and answer other questions. If we ask in writing to see a particular employee at the inspection, you must ensure that he or she is present (legal counsel may accompany the employee).

(f) If you have facilities in other countries, we expect you to locate them in places where local law does not keep us from inspecting as described in this section. We will not try to inspect if we learn that local law prohibits it, but we may suspend your certificate if we are not allowed to inspect.

### § 59.699 How do I request a hearing?

(a) You may request a hearing under certain circumstances, as described elsewhere in this subpart. To do this, you must file a written request with the Designated Compliance Officer, including a description of your objection and any supporting data, within 30 days after we make a decision.

(b) For a hearing you request under the provisions of this subpart, we will approve your request if we find that your request raises a substantial factual issue.

(c) If we agree to hold a hearing, we will use the procedures specified in 40 CFR part 1068, subpart G.