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SUBCHAPTER C—AIR PROGRAMS—(Continued)

PART 53—AMBIENT AIR MONITORING REFERENCE AND EQUIVALENT METHODS

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Subpart A—General Provisions

§ 53.1 Definitions.

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

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

(c) *Agency* means the Environmental Protection Agency.

(d) *Administrator* means the Administrator of the Environmental Protection Agency or his authorized representative.

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

(f) *Equivalent method* means a method of sampling and analyzing the ambient air for an air pollutant that has been designated as an equivalent method in accordance with this part; it does not include a method for which an equivalent method designation has been cancelled in accordance with § 53.11 or § 53.16.

(g) *Candidate method* means a method of sampling and analyzing the ambient air for an air pollutant for which an application for a reference method determination or an equivalent method determination is submitted in accordance with § 53.4, or a method tested at the initiative of the Administrator in accordance with § 53.7.

(h) *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.

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

(j) *Test analyzer* means an analyzer subjected to testing as a candidate method in accordance with subparts B, C, and/or D of this part, as applicable.

(k) *Applicant* means a person who submits an application for a reference or equivalent method determination under § 53.4, or a person who assumes the rights and obligations of an applicant under § 53.7.

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

(m) *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 concentration of PM_{10} in the sampled air.

(n) *Test sampler* means a sampler subjected to testing as part of a candidate method in accordance with subpart C or D of this part.

[40 FR 7049, Feb. 18, 1975, as amended at 41 FR 11255, Mar. 17, 1976; 52 FR 24727, July 1, 1987]

§ 53.2 General requirements for a reference method determination.

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

(2) For measuring PM_{10}, a candidate method must be a manual method that meets the requirements specified in appendix J of part 50 of this chapter and must include a PM_{10} sampler that meets the requirements specified in subpart D of this part.

(b) *Automated methods.* For measuring CO, O_3, and NO_2, a candidate automated method must utilize the measurement principle and calibration procedure specified in the appropriate appendix to part 50 of this chapter and must meet the requirements specified in subpart B of this part.

[52 FR 24727, July 1, 1987]

§ 53.3 General requirements for an equivalent method determination.

(a) *Manual methods.* Candidate manual methods must satisfy the requirements specified in subpart C of this part. In addition, samplers associated with manual methods for PM_{10} must satisfy the requirements of subpart D of this part.

(b) *Automated methods.* Candidate automated methods for pollutants other than PM_{10} must satisfy the requirements specified in subparts B and C of this part. Candidate automated methods for PM_{10} must satisfy the requirements of subparts C and D of this part.

[52 FR 24727, July 1, 1987]

§ 53.4 Applications for reference or equivalent method determinations.

(a) Applications for reference or equivalent method determinations shall be submitted in triplicate to:

Director, Environmental Monitoring Systems Laboratory, Department E, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711.

(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 and by which it may be referred to unambiguously.

(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 listing of the significant components; schematic diagrams; and a detailed description of the apparatus and measurement procedures.

(3) A copy of a comprehensive operation or instruction manual providing a complete and detailed description of

the operational and calibration procedures prescribed for field use of the candidate method and all instruments utilized as part of that method. The manual shall include adequate warning of potential safety hazards that may result from normal use, or (if the method is automated) from normal use or malfunction, of the method and a description of necessary safety precautions (see §53.9(b)). For samplers and automated methods, the manual shall include a clear description of installation and operation procedures and of necessary periodic maintenance, as well as comprehensive troubleshooting and corrective maintenance procedures and 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, and/or D of this part, as applicable.

(5) Test data, records, calculations, and test results as specified in subparts B, C, and/or D of this part, as applicable.

(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}, the application shall also contain the following:

(1) A detailed description of the quality control program 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 or sampler tested in accordance with this part.

(2) A description of the durability characteristics of such analyzers or samplers (see §53.9(c)).

[40 FR 7049, Feb. 18, 1975, as amended at 52 FR 24727, July 1, 1987]

§53.5 Processing of applications.

After receiving an application for a reference or equivalent method determination, the Administrator will publish notice of the application in the FEDERAL REGISTER and, within 75 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 his 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 75-day period shall commence upon receipt of the additional information);

(d) 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 75-day period shall commence upon receipt of the additional test data); or

(e) 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 75-day period shall commence 1 calendar day after the additional tests have been completed).

§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 his 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 his judgment 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 his 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 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.

[40 FR 7049, Feb. 18, 1975, as amended at 41 FR 11256, Mar. 17, 1976]

§ 53.8 Designation of reference and equivalent methods.

(a) A candidate method determined by the Administrator to satisfy the applicable requirements of this part shall be designated as a reference method or equivalent method (as applicable), and a notice of the designation shall be submitted for publication in the FEDERAL REGISTER not later than 15 days after the determination is made.

(b) A notice indicating that the method has been determined to be a reference method or an equivalent method shall be sent to the applicant. This notice shall constitute proof of the determination until a notice of designation is published in accordance with paragraph (a) of this section.

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

§ 53.9 Conditions of designation.

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

(a) Any method offered for sale as a reference or equivalent method shall be accompanied by a copy of the manual referred to in § 53.4(b)(3) when delivered to any ultimate purchaser.

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

(c) Any analyzer or PM_{10} sampler offered for sale as a reference or equivalent method shall function within the limits of the performance specifications referred to in § 53.20(a) or § 53.40(a), as applicable, for at least one year after delivery and acceptance when maintained and operated in accordance with the manual referred to in § 53.4(b)(3).

(d) Any analyzer or PM_{10} sampler offered for sale as a reference or equivalent method shall bear a prominent, permanently affixed label or sticker indicating that the analyzer or PM_{10} sampler has been designated by EPA as a reference method or as an equivalent method (as applicable) in accordance with this part.

(e) If an analyzer is offered for sale as a reference or equivalent method but

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

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

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

[40 FR 7049, Feb. 18, 1975, as amended at 41 FR 11256, Mar. 17, 1976; 52 FR 24728, July 1, 1987]

§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 his 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 information available to him 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, he 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 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 cancelled, he will publish a notice of cancellation in the FEDERAL REGISTER and delete the designation 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 cancelled.

§ 53.12 Request for hearing on cancellation.

Within 60 days after publication of notice in accordance with § 53.11(b)(1), the applicant or any interested person may request a hearing on the Administrator's action. 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 and (b) data or other information in support of such objections. If, after reviewing the request and supporting data, the Administrator finds that the request raises a substantial issue of fact, he will grant a hearing in accordance with § 53.13 with respect to such issue.

§ 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 the Environmental Protection Agency, 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 his representative will represent the Environmental Protection Agency in any hearing under this section.

(5) Each party other than the Environmental Protection Agency may be represented by counsel or by any other duly authorized representative.

(b)(1) Upon his 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) At his discretion, 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 leave 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 the Environmental Protection Agency.

(d)(1) The presiding officer, upon the request of any party or at his discretion, may arrange for a prehearing conference at a time and place specified by him 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 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 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 therefor 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 which he would have in 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 therefor 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 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, to the Administrator prior to implementation of the modification (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) If the applicant believes the modification will or may affect the performance characteristics of the method, a brief statement of the probable effect; and

(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); or

(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 one 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 he conducted that was a material factor in his determination. A representative of the applicant may be present during the performance of any such retest.

[40 FR 7049, Feb. 18, 1975, as amended at 40 FR 18168, Apr. 25, 1975; 41 FR 11256, Mar. 17, 1976]

§ 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 his 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; and (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 he desires such consideration. 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 75 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 in question and send notice of the determination to the applicant;

(2) Determine that it is inappropriate to propose a revision of the appendix 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 75-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 they shall be interpreted (in such cases, the 75-day period shall commence upon receipt of the additional test data); or

(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 75-day period shall commence one calendar day after the additional tests have been completed).

(e)(1) 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 will indicate that the Administrator proposes (i) to revise the appendix in question; (ii) where the appendix specifies a measurement principle and calibration procedure, to cancel reference method designations based on the appendix; and (iii) to cancel equivalent method designations based on the existing reference method(s). The notice 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) If, after consideration of comments received, the Administrator determines that the appendix in question should be revised, he will by publication in the FEDERAL REGISTER (i) promulgate the proposed revision, with such modifications as may be appropriate in view of comments received; (ii) where the appendix (prior to revision) specifies a measurement principle and calibration procedure, cancel reference method designations based on the appendix; (iii) cancel equivalent method designations based on the existing reference method(s); and (iv) 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. Cancelled 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.

(3) If the appendix 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.

(4) 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 cancelled 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.

(Secs. 110, 301(a), 313, 319, Clean Air Act (42 U.S.C. 7410, 7601(a), 7613, 7619))

[41 FR 11256, Mar. 17, 1976, as amended at 44 FR 27571, May 10, 1979]

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	

TABLE B–1—PERFORMANCE SPECIFICATIONS FOR AUTOMATED METHODS—Continued

Performance parameter	Units [1]	Sulfur dioxide	Photochemical oxidants	Carbon monoxide	Nitrogen dioxide	Definitions and test procedures
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 μ g/m³ 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_2S content of the atmosphere, p. 426, reference 5.

TABLE B–2—TEST ATMOSPHERES—Continued

Test gas	Generation	Verification
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 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. 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. 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.

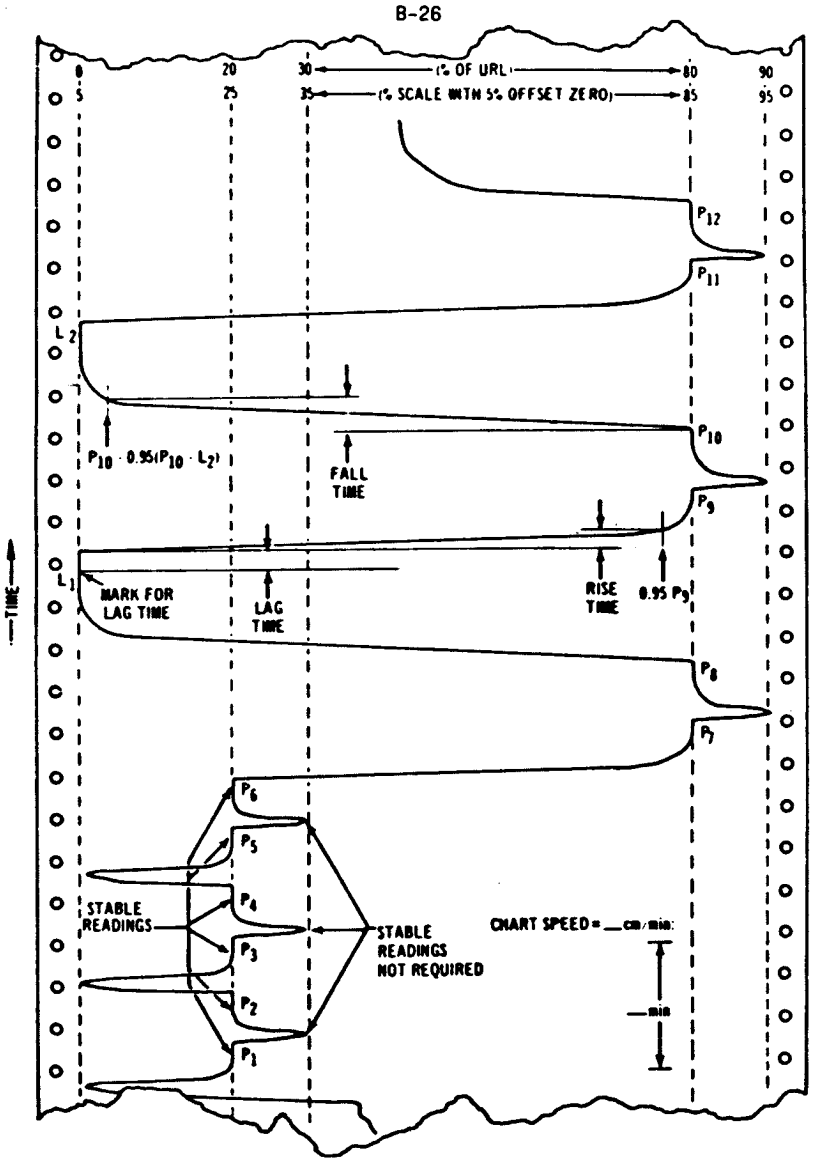

Figure B-1. Example showing the nature of the tracing obtained during the test for drift, lag time, rise time, fall time, and precision. The time scale has been greatly compressed.

(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 (12ZD) 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 24 $ZD_n=Z_n-Z_{n-1}$, or $24ZD_n=Z_n-Z'_{n-1}$ if zero adjustment was made on the previous day, where $Z_n=½\ (L_1+L_2)$ 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—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*.

TABLE B–5—SYMBOLS AND ABBREVIATIONS—Continued

n	Subscript indicating the test day number.
P	Analyzer reading for precision test.
P_i	The *i*-th analyzer reading for precision test.
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

AUTHORITY: Secs. 110, 301(a), Clean Air Act, as amended (42 U.S.C. 7410, 7601).

§ 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.

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

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

(ii) Measurements made simultaneously by a reference method, are less than or equal to the values specified in the last column of table C–1.

(2) Comparability is shown for lead methods when the differences between: (i) Measurements made by a candidate method, and (ii) measurements made by the reference method on simultaneously collected lead samples (or the same sample, if applicable), are less than or equal to the value specified in table C–3.

(3) Comparability is shown for PM_{10} methods when the relationship between: (i) Measurements made by a candidate method, and (ii) measurements made by a reference method on simultaneously collected PM_{10} samples (or the same sample, if applicable) at each of two test sites, is such that the linear regression parameters (slope, intercept, and correlation coefficient) describing the relationship meet the values specified in table C–4.

(b) *Selection of test sites*—(1) *All methods.* Each test site shall be in a predominately urban area which can be shown to have at least moderate concentrations of various pollutants. The site shall be clearly identified and shall be justified as an appropriate test site with suitable supporting evidence such as maps, population density data, vehicular traffic data, emission inventories, pollutant measurements from previous years, concurrent pollutant measurements, and wind or weather data. If desired, a request for approval of the test site or sites may be submitted prior to conducting the tests. The Administrator may in his discretion select a different site (or sites) for any additional tests he decides to conduct.

(2) *Methods for SO_2,* CO, O_3, and NO_2. 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. (See paragraph (d)(2) of this section.)

(3) *Methods for lead.* 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 lead concentrations in the specified range. Test sites for lead measurements must be located near a heavily traveled roadway.

(4) *Methods for PM_{10}.* Test measurements must be made at, 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 PM_{10} concentrations in the specified range.

(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 table C–1, C–3, or C–4, as appropriate.

(d) *Sample collection*—(1) *All methods.* All test concentration measurements or samples shall be taken in such a way that both the candidate method and the reference method receive air samples that are homogenous or as nearly identical as practical.

(2) *Methods for SO_2, CO, O_3,* and NO_2. 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 particulates and trace gases, and to insure that identical samples reach to 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.

(3) *Methods for lead and* PM_{10}. The ambient air intake points of the candidate and reference method samplers for lead or PM_{10} shall be located 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.

(4) *Methods employing a common sampling procedure.* Candidate methods which employ a sampler and sample collection procedure that are identical to the sampler and sample collection procedure specified in the reference method 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.

(e) *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.

[44 FR 37916, June 29, 1979 and 52 FR 24728, July 1, 1987]

§ 53.31 Test conditions.

(a) *All methods.* All test measurements made or test samples collected by means of a sample manifold as specified in § 53.30(d)(2) 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 paragraph (c) of this section prior to initiation of the tests.

(b) *Samplers and automated methods.* Set-up and start-up of the test analyzer, test sampler(s), and reference method (if applicable) shall be in strict accordance with the applicable operation manual(s). If the test analyzer does not have an integral strip chart recorder, connect the analyzer output to a suitable strip chart recorder of the servo, null-balance type. 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.

NOTE: 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 evaluation of data submitted.

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

(c) *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 manual method (or portion thereof) shall be calibrated if such calibration is a part of the method.

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

(e) *Operation of automated methods.* (1) Once the test analyzer has been set up and calibrated and 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. At 3–day intervals only adjustments and periodic maintenance as specified in the manual referred to in §53.4(b)(3) are permitted. 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.

[40 FR 7049, Feb. 18, 1975, as amended at 40 FR 18169, Apr. 25, 1975; 44 FR 37917, June 29, 1979; 52 FR 24728, July 1, 1987]

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

(a) Conduct the first set of simultaneous measurements with the candidate and reference methods:

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

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

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

(b) 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 constitutes a failure. (See Figure C–1 in appendix A for a suggested format for reporting the test results).

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

(1) Zero (0) failures: The candidate method passes the test for comparability.

(2) Three (3) or more failures: The candidate method fails the test for comparability.

(3) One (1) or two (2) failures: Conduct a second set of simultaneous measurements as specified in table C–1. The results of the combined total of first-set and second-set measurements shall be interpreted as follows:

(i) One (1) or two (2) failures: The candidate method passes the test for comparability.

(ii) Three (3) or more failures: The candidate method fails the test for comparability.

(4) For sulfur dioxide, 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.

(d) 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.

(e) 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.

(f) For oxidant and carbon monoxide, no more than six (6) 1-hour measurements shall be made per day. For sulfur dioxide, no more than four (4) 1-hour measurements or one (1) 24-hour measurement shall be made per day. One-hour measurements may be made concurrently with 24-hour measurements if appropriate.

(g) 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.

TABLE C–1—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	
Oxidants	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	.02
	High 0.25 to 0.35			2	2	.03
Total				7	8	

TABLE C–2—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.

[40 FR 7049, Feb. 18, 1975, as amended at 41 FR 52693, Dec. 12, 1976; 44 FR 37917, June 29, 1979; 52 FR 24728, July 1, 1987]

§ 53.33 Test procedure for methods for lead.

(a) *Sample collection.* Collect simultaneous 24-hour samples (filters) of lead at the test site or sites with both the reference and candidate methods until at least 10 filter pairs have been obtained. If the conditions of § 53.30(d)(4) apply, collect at least 10 common samples (filters) in accordance with § 53.30(d)(4) and divide each to form the filter pairs.

(b) *Audit samples.* Three audit samples must be obtained from the Director, Quality Assurance Division (MD–77), Environmental Monitoring Systems Laboratory, U.S. Environmental

Protection Agency, Research Triangle Park, NC 27711. The audit samples are ¾ × 8-inch glass fiber strips containing known amounts of lead at the following nominal levels: 100 μ g/strip; 300 μ g/strip; 750 μ g/strip. The true amount of lead in total μ g/strip will be provided with each audit sample.

(c) *Filter analysis.* (1) For both the reference method and the audit samples, analyze each filter extract 3 times in accordance with the reference method analytical procedure. The analysis of replicates should not be performed sequentially (i.e., and single sample should not be analyzed three times in sequence). Calculate the indicated lead concentratons for the reference method samples in μ g/m³ for each analysis of each filter. Calculate the indicated total lead amount for the audit samples in μ g/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}, $_{1C}$, ..., where R denotes results from the reference method samples; Q denotes results from the audit samples; 1, 2, 3 indicates filter number and A, B, C indicates 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 lead concentration in μ g/m³ for each analysis of each filter. Label these test results as C_{1A}, C_{1B}, C_{2C}, . . ., where C denotes results from the candidate method. (For candidate methods which provide a direct measurement of lead concentrates without a separable procedure, $C_{1A}=C_{1B}=C_{1C}$, $C_{2A}=C_{2B}=C_{2C}$, etc.)

(d) For the reference method, calculate the average lead concentration for each filter by averaging the concentrations calculated from the three analyses:

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

where i is the filter number.

(e) Disregard all filter pairs for which the lead concentration as determined in the previous paragraph (d) by the average of the three reference method determinations, falls outside the range of 0.5 to 4.0 μ g/m³. All remaining filter pairs must be subjected to both of the following tests for precision and comparability. At least five filter pairs must be within the 0.5 to 4.0 μ g/m³ range for the tests to be valid.

(f) *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, as follows:

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

or

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

where i indicates the filter number.

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

(g) *Test for accuracy.* (1) For the audit samples calculate the average lead concentration for each strip by averaging the concentrations calculated from the three analyses:

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

where i is audit sample number.

Calculate the percent difference (D_q) between the indicated lead concentration for each audit sample and the true lead concentration (T_q) as follows:

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

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

(h) *Test for comparability*. (1) For each filter 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, as:

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

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) exceed ±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.

(i) The candidate method must pass both the precision test and the comparability test to qualify for designation as an equivalent method.

TABLE C–3—TEST SPECIFICATIONS FOR LEAD METHODS

Concentration range, μ g/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

[44 FR 37917, June 29, 1979, as amended at 52 FR 24728, July 1, 1987]

§ 53.34 Test procedure for methods for PM_{10}.

(a) *Sample collection*. Using three reference method samplers collocated with three candidate method samplers, collect a minimum of 15 sets of simultaneous 24-hour PM_{10} samples at each of two test sites (i.e., a minimum of 30 sets of samples, each consisting of three reference method and three candidate method samples collected simultaneously, 180 samples total). If the conditions of § 53.30(d)(4) apply, collect sample sets only with the three reference method samplers.

(b) *Sample analysis*. Analyze each sample (or the same sample if § 53.30(d)(4) applies) according to the reference method or candidate method, as appropriate, and determine the PM_{10} concentration in μg/m³.

(c) *Test for comparability*. (1) For each of the sample sets, calculate the average PM_{10} concentration obtained with the reference method samplers:

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

where R denotes results from the reference method, i is the sampler number, and j is the set.

(2) For each of the sample sets, calculate the precision of the reference method PM_{10}

MEASUREMENTS:

$$P_j = \sqrt{\frac{\sum_{i=1}^{3} R^2{}_{ij} - \left(\sum_{i=1}^{3} R_{ij}\right)^{\frac{2}{3}}}{2}}$$

$$\text{if } \overline{R}_j \text{ is above } 80\,\mu g/m^3, \text{or}$$

$$RP_j = 100\% \times \sqrt{\frac{\sum_{i=1}^{3} R^2{}_{ij} - \left(\sum_{i=1}^{3} R_{ij}\right)^{\frac{2}{3}}}{2}} / \overline{R}_j$$

$$\text{if } \overline{R}_j \text{ is above } 80\,\mu g/m^3.$$

(3) If R_j falls outside the acceptable concentration range specified in table C–4 for any set, or if P_j or RP_j, as applicable, exceeds the value specified in table C–4 for any set, that set of samples shall be discarded. For each site, at least three of the sample sets shall have R_j values below 80 μg/m³ and at least three of the sample sets shall have R_j values above 80 μg/m³. Additional sample sets shall be collected and analyzed, as necessary, to provide a minimum of 10 acceptable sample sets for each site. If more than 10 sample sets meet the above criteria, all such sample sets shall be used to demonstrate comparability.

(4) For each of the acceptable sample sets, calculate the average PM_{10} concentration obtained with the candidate method samplers:

$$\overline{C}_j = \frac{\sum_{i=1}^{3} C_{ij}}{3}$$

where C denotes results from the candidate method, i is the sampler number, and j is the set.

(5) For each site, plot the average PM_{10} measurements obtained with the candidate method (C_j) against the corresponding average PM_{10} measurements obtained with the reference method (R_j). For each site, calculate and record the linear regression slope and intercept, and the correlation coefficient.

(6) If the linear regression parameters calculated above meet the values specified in table C–4 for each test site, the candidate method passes the test for comparability.

TABLE C–4—TEST SPECIFICATIONS FOR PM_{10} METHODS

Acceptable concentration range, mu;g/m³	30 to 500.
Minimum number of test sites	2.
Number of candidate method samplers per site	3.
Number of reference method samplers per site	3.
Minimum number of 24-hour samples per sampler per site.	15.
Minimum number of acceptable sample sets per site.	10.
Precision of replicate reference method measurements.	5 μg/m³ or 7 percent.
Slope of regression relationship	1±0.1.
Intercept of regression relationship, μg/m³	0±5.
Correlation of reference method and candidate method measurements.	≥0.97.

[52 FR 24729, July 1, 1987]

APPENDIX A TO SUBPART C—OPTIONAL FORM FOR REPORTING TEST RESULTS

Candidate Method _____

Reference Method _____

Applicant _____ Pollutant _____

☐ First Set ☐ Second Set ☐ Type ☐ 1 hour ☐ 24 hour

CONCENTRATION RANGE		DATE	TIME	CONCENTRATION, ppm		DIFFERENCE	TABLE C-1 SPEC.	PASS OR FAIL
				CANDIDATE	REFERENCE			
LOW _____ ppm to _____ ppm	1							
	2							
	3							
	4							
	5							
	6							
MEDIUM _____ ppm to _____ ppm	1							
	2							
	3							
	4							
	5							
	6							
HIGH _____ ppm to _____ ppm	1							
	2							
	3							
	4							
	5							
	6							
	7							
	8							
							TOTAL FAILURES:	

Figure C 1. Form for Subpart C test results.

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

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.

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*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.

(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.
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	/	/	/

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

Particle size (µm) [a]	Wind speed (km/hr)		
	2	8	24
25±1.0	*l*	*l*/s	*l*/s

[a] ≥ Mass median aerodynamic diameter.
l=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 semilogarithmic 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

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)
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
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.

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 located within 25 miles of a state's seaward boundary, 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.

§ 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) 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, 55.11, 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.

§ 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 shall retain authority to implement and enforce all requirements of this part for OCS sources located beyond 25 miles from states' seaward boundaries.

(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]

§ 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 the 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 to the Administrator for authority to implement and enforce the requirements of this OCS program within 25 miles of the state seaward boundary, pursuant to section 328(a)(3) of the Act. 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.

§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) and (5) [Reserved]

(6) Florida.

(i) 40 CFR part 52, subpart K.

(ii) [Reserved]

(7) through (16) [Reserved]

(17) North Carolina.

(i) 40 CFR part 52, subpart II.

(ii) [Reserved]

(18) through (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 Office of the Federal Register, 800 North Capitol Street, NW., Suite 700, Washington, DC. 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 Street, 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,* August 21, 1992.

(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,* August 30, 1994.

(ii) Local requirements.

(A)–(D) [Reserved]

(E) *San Luis Obispo County Air Pollution Control District Requirements Applicable to OCS Sources,* March 11, 1994.

(F) *Santa Barbara County Air Pollution Control District Requirements Applicable to OCS Sources,* April, 1996.

(G) *South Coast Air Quality Management District Requirements Applicable to OCS Sources* (Part I and Part II), April, 1996.

(H) *Ventura County Air Pollution Control District Requirements Applicable to OCS Sources,* April, 1996.

(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) through (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) through (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]

§ 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 requirements are contained in *State of Alaska Requirements Applicable to OCS Sources,* August 21, 1992:

Alaska Administrative Code—Department of Environmental Conservation. The following sections of Title 18, Chapter 50:

18 AAC 50.020 Ambient Air Quality Standards (Effective 7/21/91)
18 AAC 50.030 Open Burning (Effective 10/30/83)
18 AAC 50.040 Incinerators (Effective 10/30/83)
18 AAC 50.050 Industrial Processes and Fuel Burning Equipment (Effective 5/11/91)
18 AAC 50.090 Ice Fog Limitations (Effective 5/26/72)
18 AAC 50.100 Marine Vessels (Effective 7/21/91)
18 AAC 50.110 Air Pollution Prohibited (Effective 5/26/72)
18 AAC 50.300 Permit to Operate (Effective 7/21/91)
18 AAC 50.310 Revocation or Suspension of Permit (Effective 5/4/80)
18 AAC 50.400 Application Review and Issuance of Permit to Operate (Effective 7/21/91)
18 AAC 50.500 Source Testing (Effective 6/2/88)
18 AAC 50.510 Ambient Analysis Methods (Effective 7/21/91)
18 AAC 50.520 Emission and Ambient Monitoring (Effective 7/21/91)
18 AAC 50.530 Circumvention (Effective 6/7/87)
18 AAC 50.620 Air Quality Control Plan; Volume II, Section IV: Paragraph F.—Facility Review Procedures; Paragraph G.—Application Review and Permit Development, only. (Effective 7/21/91)
18 AAC 50.900 Definitions (Effective 7/21/91)

(b) Local requirements.

(1) the following requirements are contained in *South Central Alaska Clean Air Authority Requirements Applicable to OCS Sources,* August 21, 1992:

15.30.030 Definitions
15.30.100 Registration and Notification, except E
15.30.110 Permit to Operate
15.30.120 Source Reports

15.30.130 Source Tests
15.35.040 Stationary Source Emissions—General Definitions
15.35.050 Stationary Source Emissions—Visible Emission Standards
15.35.060 Stationary Source Emissions—Emission Standards
15.35.080 Stationary Source Emissions—Circumvention
15.35.090 Stationary Source Emissions—Fugitive Emissions
15.35.100 Stationary Source Emissions—Open Burning

California

(a) State requirements.

(1) The following requirements are contained in *State of California Requirements applicable to OCS Sources*, August 30, 1994:

Barclays California Code of Regulations. The following section of Title 17 Subchapter 6:

17 §92000 Definitions (Adopted 5/31/91)
17 §92100 Scope and Policy (Adopted 10/18/82)
17 §92200 Visible Emission Standards (Adopted 5/31/91)
17 §92210 Nuisance Prohibition (Adopted 10/18/82)
17 §92220 Compliance with Performance Standards (Adopted 5/31/91)
17 §92400 Visible Evaluation Techniques (Adopted 5/31/91)
17 §92500 General Provisions (Adopted 5/31/91)
17 §92510 Pavement Marking (Adopted 5/31/91)
17 §92520 Stucco and Concrete (Adopted 5/31/91)
17 §92530 Certified Abrasives (Adopted 5/31/91)
17 §92540 Stucco and Concrete (Adopted 5/31/91)

(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*, March 11, 1994:

Rule 103 Conflicts Between District, State and Federal Rules (Adopted 8/6/76)
Rule 104 Action in Areas of High Concentration (Adopted 7/5/77)
Rule 105 Definitions (Adopted 10/6/93)
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. (Adopted 11/5/91)
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 9/15/92)
Rule 305 Fees for Major Non-Vehicular Sources (title change–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 (Adopted 12/6/76)
Rule 405 Nitrogen Oxides Emission Standards, Limitations and Prohibitions (Adopted 11/13/84)
Rule 406 Carbon Monoxide Emission Standards, Limitations and Prohibitions (Adopted 11/14/84)
Rule 407 Organic Material Emission Standards, Limitations and Prohibitions (Adopted 1/10/89)
Rule 411 Surface Coating of Metal Parts and Products (Adopted 1/10/89)
Rule 416 Degreasing Operations (Adopted 6/18/79)
Rule 417 Control of Fugitive Emissions of Volatile Organic Compounds (Adopted 2/9/93)
Rule 422 Refinery Process Turnarounds (Adopted 6/18/79)
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 9/4/90)

(6) The following requirements are contained in *Santa Barbara County Air Pollution Control District Requirements Applicable to OCS Sources*, April 1996:

Rule 102 Definitions (Adopted 7/30/91)
Rule 103 Severability (Adopted 10/23/78)
Rule 201 Permits Required (Adopted 7/2/79)
Rule 202 Exemptions to Rule 201 (Adopted 3/10/92)
Rule 203 Transfer (Adopted 10/23/78)
Rule 204 Applications (Adopted 10/23/78)
Rule 205 Standards for Granting Applications (Adopted 7/30/91)
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 5/7/91)
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 10/2/90)
Rule 316 Storage and Transfer of Gasoline (Adopted 12/14/93)
Rule 317 Organic Solvents (Adopted 10/23/78)
Rule 318 Vacuum Producing Devices or Systems-Southern Zone (Adopted 10/23/78)
Rule 321 Control of Degreasing Operations (Adopted 7/10/90)
Rule 322 Metal Surface Coating Thinner and Reducer (Adopted 10/23/78)
Rule 323 Architectural Coatings (Adopted 3/16/95)
Rule 324 Disposal and Evaporation of Solvents (Adopted 10/23/78)
Rule 325 Crude Oil Production and Separation (Adopted 1/25/94)
Rule 326 Storage of Reactive Organic Liquid Compounds (Adopted 12/14/93)
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 Miscellaneous Metal Parts and Products (Adopted 4/21/95)
Rule 331 Fugitive Emissions Inspection and Maintenance (Adopted 12/10/91)
Rule 332 Petroleum Refinery Vacuum Producing Systems, Wastewater Separators and Process Turnarounds (Adopted 6/11/79)
Rule 333 Control of Emissions from Reciprocating Internal Combustion Engines (Adopted 12/10/91)
Rule 342 Control of Oxides of Nitrogen (NO_X from Boilers, Steam Generators and Process Heaters) (Adopted 03/10/92)
Rule 343 Petroleum Storage Tank Degassing (Adopted 12/14/93)
Rule 344 Petroleum Sumps, Pits, and Well Cellars (Adopted 11/10/94)
Rule 359 Flares and Thermal Oxidizers (6/28/94)
Rule 370 Potential to Emit—Limitations for Part 70 Sources (Adopted 6/15/95)
Rule 505 Breakdown Conditions Sections A.,B.1,. and D. only (Adopted 10/23/78)
Rule 603 Emergency Episode Plans (Adopted 6/15/81)
Rule 702 General Conformity (Adopted 10/20/94)
Rule 1301 Part 70 Operating Permits—General Information (Adopted 11/09/93)
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,* April 1996:

Rule 102 Definition of Terms (Adopted 11/4/88)
Rule 103 Definition of Geographical Areas (Adopted 1/9/76)
Rule 104 Reporting of Source Test Data and Analyses (Adopted 1/9/76)
Rule 108 Alternative Emission Control Plans (Adopted 4/6/90)
Rule 109 Recordkeeping for Volatile Organic Compound Emissions (Adopted 3/6/92)
Rule 201 Permit to Construct (Adopted 1/5/90)
Rule 201.1 Permit Conditions in Federally Issued Permits to Construct (Adopted 1/5/90)
Rule 202 Temporary Permit to Operate (Adopted 5/7/76)
Rule 203 Permit to Operate (Adopted 1/5/90)
Rule 204 Permit Conditions (Adopted 3/6/92)
Rule 205 Expiration of Permits to Construct (Adopted 1/5/90)
Rule 206 Posting of Permit to Operate (Adopted 1/5/90)
Rule 207 Altering or Falsifying of Permit (Adopted 1/9/76)
Rule 208 Permit for Open Burning (Adopted 1/5/90)
Rule 209 Transfer and Voiding of Permits (Adopted 1/5/90)
Rule 210 Applications (Adopted 1/5/90)
Rule 212 Standards for Approving Permits (Adopted 8/12/94) except (c)(3) and (e)
Rule 214 Denial of Permits (Adopted 1/5/90)
Rule 217 Provisions for Sampling and Testing Facilities (Adopted 1/5/90)
Rule 218 Stack Monitoring (Adopted 8/7/81)
Rule 219 Equipment Not Requiring a Written Permit Pursuant to Regulation II (Adopted 8/12/94)
Rule 220 Exemption—Net Increase in Emissions (Adopted 8/7/81)
Rule 221 Plans (Adopted 1/4/85)
Rule 301 Permit Fees (Adopted 6/10/94) except (e)(3)and Table IV
Rule 304 Equipment, Materials, and Ambient Air Analyses (Adopted 6/10/94)
Rule 304.1 Analyses Fees (Adopted 6/10/94)
Rule 305 Fees for Acid Deposition (Adopted 10/4/91)
Rule 306 Plan Fees (Adopted 6/10/94)
Rule 309 Fees for Regulation XVI (Adopted 6/10/94)
Rule 401 Visible Emissions (Adopted 4/7/89)
Rule 403 Fugitive Dust (Adopted 7/9/93)
Rule 404 Particulate Matter—Concentration (Adopted 2/7/86)
Rule 405 Solid Particulate Matter—Weight (Adopted 2/7/86)
Rule 407 Liquid and Gaseous Air Contaminants (Adopted 4/2/82)

Rule 408 Circumvention (Adopted 5/7/76)
Rule 409 Combustion Contaminants (Adopted 8/7/81)
Rule 429 Start-Up and Shutdown Provisions for Oxides of Nitrogen (Adopted 12/21/90)
Rule 430 Breakdown Provisions, (a) and (e) only (Adopted 5/5/78)
Rule 431.1 Sulfur Content of Gaseous Fuels (Adopted 10/2/92)
Rule 431.2 Sulfur Content of Liquid Fuels (Adopted 5/4/90)
Rule 431.3 Sulfur Content of Fossil Fuels (Adopted 5/7/76)
Rule 441 Research Operations (Adopted 5/7/76)
Rule 442 Usage of Solvents (Adopted 3/5/82)
Rule 444 Open Fires (Adopted 10/2/87)
Rule 463 Organic Liquid Storage (Adopted 3/11/94)
Rule 465 Vacuum Producing Devices or Systems (Adopted 11/1/91)
Rule 468 Sulfur Recovery Units (Adopted 10/8/76)
Rule 473 Disposal of Solid and Liquid Wastes (Adopted 5/7/76)
Rule 474 Fuel Burning Equipment-Oxides of Nitrogen (Adopted 12/4/81)
Rule 475 Electric Power Generating Equipment (Adopted 8/7/78)
Rule 476 Steam Generating Equipment (Adopted 10/8/76)
Rule 480 Natural Gas Fired Control Devices (Adopted 10/7/77)
Addendum to Regulation IV (Effective 1977)
Rule 701 General (Adopted 7/9/82)
Rule 702 Definitions (Adopted 7/11/80)
Rule 704 Episode Declaration (Adopted 7/9/82)
Rule 707 Radio—Communication System (Adopted 7/11/80)
Rule 708 Plans (Adopted 7/9/82)
Rule 708.1 Stationary Sources Required to File Plans (Adopted 4/4/80)
Rule 708.2 Content of Stationary Source Curtailment Plans (Adopted 4/4/80)
Rule 708.4 Procedural Requirements for Plans (Adopted 7/11/80)
Rule 709 First Stage Episode Actions (Adopted 7/11/80)
Rule 710 Second Stage Episode Actions (Adopted 7/11/80)
Rule 711 Third Stage Episode Actions (Adopted 7/11/80)
Rule 712 Sulfate Episode Actions (Adopted 7/11/80)
Rule 715 Burning of Fossil Fuel on Episode Days (Adopted 8/24/77)
Regulation IX—New Source Performance Standards (Adopted 4/8/94)
Rule 1106 Marine Coatings Operations (Adopted 1/13/95)
Rule 1107 Coating of Metal Parts and Products (Adopted 5/12/95)
Rule 1109 Emissions of Oxides of Nitrogen for Boilers and Process Heaters in Petroleum Refineries (Adopted 8/5/88)
Rule 1110 Emissions from Stationary Internal Combustion Engines (Demonstration) (Adopted 11/6/81)
Rule 1110.1 Emissions from Stationary Internal Combustion Engines (Adopted 10/4/85)
Rule 1110.2 Emissions from Gaseous and Liquid-Fueled Internal Combustion Engines (Adopted 12/9/94)
Rule 1113 Architectural Coatings (Adopted 9/6/91)
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 3/10/95)
Rule 1122 Solvent Cleaners (Degreasers) (Adopted 4/5/91)
Rule 1123 Refinery Process Turnarounds (Adopted 12/7/90)
Rule 1129 Aerosol Coatings (Adopted 11/2/90)
Rule 1134 Emissions of Oxides of Nitrogen from Stationary Gas Turbines (Adopted 8/4/89)
Rule 1136 Wood Products Coatings (Adopted 8/12/94)
Rule 1140 Abrasive Blasting (Adopted 8/2/85)
Rule 1142 Marine Tank Vessel Operations (Adopted 7/19/91)
Rule 1146 Emissions of Oxides of Nitrogen from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters (Adopted 5/13/94)
Rule 1146.1 Emission of Oxides of Nitrogen from Small Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters (Adopted 5/13/94)
Rule 1148 Thermally Enhanced Oil Recovery Wells (Adopted 11/5/82)
Rule 1149 Storage Tank Degassing (Adopted 4/1/88)
Rule 1168 Control of Volatile Organic Compound Emissions from Adhesive Application (Adopted 12/10/93)
Rule 1171 Solvent Cleaning Operations (Adopted 5/12/95)
Rule 1173 Fugitive Emissions of Volatile Organic Compounds (Adopted 5/13/94)
Rule 1176 Sumps and Wastewater Separators (Adopted 5/13/94)
Rule 1301 General (Adopted 6/28/90)
Rule 1302 Definitions (Adopted 5/3/91)
Rule 1303 Requirements (Adopted 5/3/91)
Rule 1304 Exemptions (Adopted 9/11/92)
Rule 1306 Emission Calculations (Adopted 5/3/91)
Rule 1313 Permits to Operate (Adopted 6/28/90)
Rule 1403 Asbestos Emissions from Demolition/Renovation Activities (Adopted 4/8/94)
Rule 1610 Old-Vehicle Scrapping (Adopted 1/14/94)
Rule 1701 General (Adopted 1/6/89)
Rule 1702 Definitions (Adopted 1/6/89)
Rule 1703 PSD Analysis (Adopted 10/7/88)
Rule 1704 Exemptions (Adopted 1/6/89)
Rule 1706 Emission Calculations (Adopted 1/6/89)
Rule 1713 Source Obligation (Adopted 10/7/88)
Regulation XVII Appendix (effective 1977)

Rule 1901 General Conformity (Adopted 9/9/94)
Rule 2000 General (Adopted 10/15/93)
Rule 2001 Applicability (Adopted 10/15/93)
Rule 2002 Allocations for oxides of nitrogen (NO_X) and oxides of sulfur (SOx) Emissions (Adopted 3/10/95)
Rule 2004 Requirements (Adopted 10/15/93) except (l) (2 and 3)
Rule 2005 New Source Review for RECLAIM (Adopted 10/15/93) except (i)
Rule 2006 Permits (Adopted 10/15/93)
Rule 2007 Trading Requirements (Adopted 10/15/93)
Rule 2008 Mobiles Source Credits (Adopted 10/15/93)
Rule 2010 Administrative Remedies and Sanctions (Adopted 10/15/93)
Rule 2011 Requirements for Monitoring, Reporting, and Recordkeeping for Oxides of Sulfur (SO_X) Emissions (Adopted 10/15/93)
Appendix A Volume IV—(Protocol for oxides of sulfur) (Adopted 3/10/95)
Rule 2012 Requirements for Monitoring, Reporting, and Recordkeeping for Oxides of Nitrogen (NO_X) Emissions (Adopted 10/15/93)
Appendix A Volume V—(Protocol for oxides of nitrogen) (Adopted 3/10/95)
Rule 2015 Backstop Provisions (Adopted 10/15/93) except (b)(1)(G) and (b)(3)(B)
XXXI Acid Rain Permit Program (Adopted 2/10/95)

(8) The following requirements are contained in *Ventura County Air Pollution Control District Requirements Applicable to OCS Sources*, April 1996:

Rule 2 Definitions (Adopted 12/15/92)
Rule 5 Effective Date (Adopted 5/23/72)
Rule 6 Severability (Adopted 11/21/78)
Rule 7 Zone Boundaries (Adopted 6/14/77)
Rule 10 Permits Required (Adopted 6/13/95)
Rule 11 Definition for Regulation II (Adopted 6/13/95)
Rule 12 Application for Permits (Adopted 6/13/95)
Rule 13 Action on Applications for an Authority to Construct (Adopted 6/13/95)
Rule 14 Action on Applications for a Permit to Operate (Adopted 6/13/95)
Rule 15.1 Sampling and Testing Facilities (Adopted 10/12/93)
Rule 16 BACT Certification (Adopted 6/13/95)
Rule 19 Posting of Permits (Adopted 5/23/72)
Rule 20 Transfer of Permit (Adopted 5/23/72)
Rule 23 Exemptions from Permits (Adopted 12/13/94)
Rule 24 Source Recordkeeping, Reporting, and Emission Statements (Adopted 9/15/92)
Rule 26 New Source Review (Adopted 10/22/91)
Rule 26.1 New Source Review—Definitions (Adopted 10/22/91)
Rule 26.2 New Source Review—Requirements (Adopted 10/22/91)
Rule 26.3 New Source Review—Exemptions (Adopted 10/22/91)
Rule 26.6 New Source Review—Calculations (Adopted 10/22/91)
Rule 26.8 New Source Review—Permit To Operate (Adopted 10/22/91)
Rule 26.10 New Source Review—PSD (Adopted 10/22/91)
Rule 28 Revocation of Permits (Adopted 7/18/72)
Rule 29 Conditions on Permits (Adopted 10/22/91)
Rule 30 Permit Renewal (Adopted 5/30/89)
Rule 32 Breakdown Conditions: Emergency Variances, A., B.1., and D. only. (Adopted 2/20/79)
Rule 33 Part 70 Permits—General (Adopted 10/12/93)
Rule 33.1 Part 70 Permits—Definitions (Adopted 10/12/93)
Rule 33.2 Part 70 Permits—Application Contents (Adopted 10/12/93)
Rule 33.3 Part 70 Permits—Permit Content (Adopted 10/12/93)
Rule 33.4 Part 70 Permits—Operational Flexibility (Adopted 10/12/93)
Rule 33.5 Part 70 Permits—Timeframes 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 10/12/93)
Rule 33.8 Part 70 Permits—Reopening of Permits (Adopted 10/12/93)
Rule 33.9 Part 70 Permits—Compliance Provisions (Adopted 10/12/93)
Rule 33.10 Part 70 Permits—General Part 70 Permits (Adopted 10/12/93)
Rule 34 Acid Deposition Control (Adopted 3/14/95)
Appendix II–B Best Available Control Technology (BACT) Tables (Adopted 12/86)
Rule 42 Permit Fees (Adopted 7/11/95)
Rule 44 Exemption Evaluation Fee (Adopted 1/8/91)
Rule 45 Plan Fees (Adopted 6/19/90)
Rule 45.2 Asbestos Removal Fees (Adopted 8/4/92)
Rule 50 Opacity (Adopted 2/20/79)
Rule 52 Particulate Matter-Concentration (Adopted 5/23/72)
Rule 53 Particulate Matter-Process Weight (Adopted 7/18/72)
Rule 54 Sulfur Compounds (Adopted 6/14/94)
Rule 56 Open Fires (Adopted 3/29/94)
Rule 57 Combustion Contaminants-Specific (Adopted 6/14/77)
Rule 60 New Non-Mobile Equipment-Sulfur Dioxide, Nitrogen Oxides, and Particulate Matter (Adopted 7/8/72)
Rule 62.7 Asbestos—Demolition and Renovation (Adopted 6/16/92)
Rule 63 Separation and Combination of Emissions (Adopted 11/21/78)
Rule 64 Sulfur Content of Fuels (Adopted 6/14/94)
Rule 66 Organic Solvents (Adopted 11/24/87)

Rule 67 Vacuum Producing Devices (Adopted 7/5/83)
Rule 68 Carbon Monoxide (Adopted 6/14/77)
Rule 71 Crude Oil and Reactive Organic Compound Liquids (Adopted 12/13/94)
Rule 71.1 Crude Oil Production and Separation (Adopted 6/16/92)
Rule 71.2 Storage of Reactive Organic Compound Liquids (Adopted 9/26/89)
Rule 71.3 Transfer of Reactive Organic Compound Liquids (Adopted 6/16/92)
Rule 71.4 Petroleum Sumps, Pits, Ponds, and Well Cellars (Adopted 6/8/93)
Rule 71.5 Glycol Dehydrators (Adopted 12/13/94)
Rule 72 New Source Performance Standards (NSPS) (Adopted 6/28/94)
Rule 74 Specific Source Standards (Adopted 7/6/76)
Rule 74.1 Abrasive Blasting (Adopted 11/12/91)
Rule 74.2 Architectural Coatings (Adopted 08/11/92)
Rule 74.6 Surface Cleaning and Degreasing (Adopted 5/8/90)
Rule 74.6.1 Cold Cleaning Operations (Adopted 9/12/89)
Rule 74.6.2 Batch Loaded Vapor Degreasing Operations (Adopted 9/12/89)
Rule 74.7 Fugitive Emissions of Reactive Organic Compounds at Petroleum Refineries and Chemical Plants (Adopted 1/10/89)
Rule 74.8 Refinery Vacuum Producing Systems, Waste-water Separators and Process Turnarounds (Adopted 7/5/83)
Rule 74.9 Stationary Internal Combustion Engines (Adopted 12/21/93)
Rule 74.10 Components at Crude Oil Production Facilities and Natural Gas Production and Processing Facilities (Adopted 6/16/92)
Rule 74.11 Natural Gas-Fired Residential Water Heaters-Control of NO_X (Adopted 4/9/85)
Rule 74.12 Surface Coating of Metal Parts and Products (Adopted 12/13/94)
Rule 74.15 Boilers, Steam Generators and Process Heaters (5MM BTUs and greater) (Adopted 11/8/94)
Rule 74.15.1 Boilers, Steam Generators and Process Heaters (1–5MM BTUs)(Adopted 6/13/95)
Rule 74.16 Oil Field Drilling Operations (Adopted 1/8/91)
Rule 74.20 Adhesives and Sealants (Adopted 6/8/93)
Rule 74.23 Stationary Gas Turbines (Adopted 3/14/95)
Rule 74.24 Marine Coating Operations (Adopted 3/8/94)
Rule 74.26 Crude Oil Storage Tank Degassing Operations (Adopted 11/8/94)
Rule 74.27 Gasoline and ROC Liquid Storage Tank Degassing Operations (Adopted 11/8/94)
Rule 74.28 Asphalt Roofing Operations (Adopted 5/10/94)
Rule 74.30 Wood Products Coatings (Adopted 5/17/94)
Rule 75 Circumvention (Adopted 11/27/78)
Appendix IV–A Soap Bubble Tests (Adopted 12/86)
Rule 100 Analytical Methods (Adopted 7/18/72)
Rule 101 Sampling and Testing Facilities (Adopted 5/23/72)
Rule 102 Source Tests (Adopted 11/21/78)
Rule 103 Stack Monitoring (Adopted 6/4/91)
Rule 154 Stage 1 Episode Actions (Adopted 9/17/91)
Rule 155 Stage 2 Episode Actions (Adopted 9/17/91)
Rule 156 Stage 3 Episode Actions (Adopted 9/17/91)
Rule 158 Source Abatement Plans (Adopted 9/17/91)
Rule 159 Traffic Abatement Procedures (Adopted 9/17/91)
Rule 220 General Conformity (Adopted 5/9/95)

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)
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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]

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

[1] Part 51 is entitled, ''Requirements for Preparation, Adoption, and Submittal of Implementation Plans.'' Part 58 is entitled, ''Ambient Air Quality Surveillance.''

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, 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

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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 requrements.* 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, 401 M Street SW., 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 4.645m² (50 ft²) or at a point no closer to the wall than 0.914m (3 ft) if the cross sectional area is 4.645m² (50 ft²) 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 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 pararaphs (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, 401 M Street, SW., 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 specificially 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, 401 M Street, SW., 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 particpate 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 eligiblity for an NSO is prequisite 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, 401 M Street SW., 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 specifc 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 historoical 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.

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

[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).

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 adjustmens to certain revenue and cost estimates in the repective 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 quidelines to an applicant in preparing the required cost and revenue estimates. In particular, copper smelting charges provided in nominal-dollar terms must be used dierctly 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, by-product, 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

[2] Documentation of the EPA forecasts is provided as part of Item NO. IV–A–2 in EPA Docket No. A–82–35.

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 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

[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).

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 classsified 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 nonsmelter 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					

SCHEDULE A.1—HISTORICAL REVENUE DATA—Continued

[Smelter identification]

	Line	1979	1980	1981	1982	1983
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					
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					

SCHEDULE A.2—HISTORICAL COST DATA—Continued

[Smelter identification]

	Line	1979	1980	1981	1982	1983
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					
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					

SCHEDULE A.3—HISTORICAL PROFIT AND LOSS SUMMARY—Continued

[Smelter identification]

	Line	1979	1980	1981	1982	1983
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					
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							
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 faciltites	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							
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							

SCHEDULE B.6—CONSTANT CONTROLS PROFIT AND LOSS SUMMARY FOR THE PROFIT PROTECTION TEST—Continued

[Smelter identification]

	Line	1984	1985	1986	1987	1988	1989	1990
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
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	.....	.....	.....	.....	.....	.....	.....

SCHEDULE C.1—CONSTANT CONTROLS PROFIT AND LOSS SUMMARY FOR THE RATE OF RETURN TEST—Continued

[Smelter identification]

	Line	1984	1985	1986	1987	1988	1989	1990
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							
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		

SCHEDULE C.3—HISTORICAL CAPITAL INVESTMENT IN CONSTANT DOLLARS—Continued

[Smelter identification]

Items from 1983 balance sheet	Line	Nominal dollars	Constant dollars
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
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							
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							

SCHEDULE D.3—INTERIM CONTROLS FORECAST PROFIT AND LOSS SUMMARY—Continued

[Smelter identification]

	Line	1984	1985	1986	1987	1988	1989	1990
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 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

SCHEDULE D.6—PERMANENT WAIVER FROM INTERIM CONTROLS TEST—Continued

[Smelter identification]

	Line	1984	1985	1986	1987	1988	1989	1990	Total
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
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 AND DAILY REPORTING

AUTHORITY: 42 U.S.C. 7410, 7601(a), 7613, and 7619.

SOURCE: 44 FR 27571, May 10, 1979, as amended at 59 FR 41628, Aug. 12, 1994.

Subpart A—General Provisions

§ 58.1 Definitions.

As used in this part, all terms not defined herein have the meaning given them in the Act:

(a) *Act* means the Clean Air Act as amended (42 U.S.C. 7401, *et seq.*).

(b) *SLAMS* means State or Local Air Monitoring Station(s). The SLAMS make up the ambient air quality monitoring network which is required by § 58.20 to be provided for in the State's implementation plan. This definition places no restrictions on the use of the physical structure or facility housing the SLAMS. Any combination of SLAMS and any other monitors (Special Purpose, NAMS, PSD) may occupy the same facility or structure without affecting the respective definitions of those monitoring station.

(c) *NAMS* means National Air Monitoring Station(s). Collectively the NAMS are a subset of the SLAMS ambient air quality monitoring network.

(d) *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 part 51 of this chapter.

(e) SO_2 means sulfur dioxide.

(f) 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.

(g) *CO* means carbon monoxide.

(h) O_3 means ozone.

(i) *Plan* means an implementation plan, approved or promulgated pursuant to section 110 of the Clean Air Act.

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

(k) *Regional Administrator* means the Administrator of one of the ten EPA Regional Offices or his or her authorized representative.

(l) *State agency* means the air pollution control agency primarily responsible for development and implementation of a plan under the Act.

(m) *Local agency* means any local government agency, other than the State agency, which is charged with the responsibility for carrying out a portion of the plan.

(n) *Indian Reservation* means any Federally recognized reservation established by treaty, agreement, executive order, or act of Congress.

(o) *Indian Governing Body* means the governing body of any tribe, band, or group of Indians subject to the jurisdiction of the United States and recognized by the United States as possessing power of self-government.

(p) *Aerometric Information Retrieval System (AIRS)-Air Quality Subsystem (AQS)* is EPA's computerized system for storing and reporting of information relating to ambient air quality data.

(q) *Storage and Retrieval of Aerometric Data (SAROAD)* system is a computerized system which stores and reports information relating to ambient air quality. The SAROAD system has been replaced with the AIRS-AQS system; however, the SAROAD data reporting format continues to be used by some States and local air pollution agencies as an interface to AIRS on an interim basis.

(r) *SAROAD site identification form* is one of the several forms in the SAROAD system. It is the form which provides a complete description of the site (and its surroundings) of an ambient air quality monitoring station.

(s) *Traceable* means that a local standard has been compared and certified, either directly or via not more than one intermediate standard, to a primary standard such as a National Institute of Standards and Technology Standard Reference Material (NIST SRM) or a USEPA/NIST-approved Certified Reference Material (CRM).

(t) *Urban area population* means the population defined in the most recent decennial U.S. Census of Population Report.

(u) *TSP* (total suspended particulates) means particulate matter as measured by the method described in appendix B of part 50 of this chapter,

(v) 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.

(w) *Pb* means lead.

(x) *PAMS* means Photochemical Assessment Monitoring Stations.

(y) *VOC* means volatile organic compounds.

(z) *Meteorological measurements* means measurements of wind speed, wind direction, barometric pressure, temperature, relative humidity, and solar radiation.

(aa) *Point analyzer* is 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.

(bb) *Probe* is the actual inlet where an air sample is extracted from the atmosphere for delivery to a sampler or point analyzer for pollutant analysis.

(cc) *Open path analyzer* is 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.

(dd) *Monitoring path* for an open path analyzer is the actual path in space between two geographical locations over which the pollutant concentration is measured and averaged.

(ee) *Monitoring path length* of an open path analyzer is 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.

(ff) *Optical measurement path length* is 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.

(gg) *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.

(hh) *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.

(ii) *Monitor* is a generic term for 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 provisions of appendix C to this part, including both point and open path analyzers that have been designated as either reference or equivalent methods under part 53 of this chapter and air samplers that are specified as part of a manual method that has been designated as a reference or equivalent method under part 53 of this chapter.

[44 FR 27571, May 10, 1979, as amended at 48 FR 2529, Jan. 20, 1983; 51 FR 9586, Mar. 19, 1986; 52 FR 24739, July 1, 1987; 58 FR 8467, Feb. 12, 1993; 59 FR 41628, 41629, Aug. 12, 1994; 60 FR 52319, Oct. 6, 1995]

§ 58.2 Purpose.

(a) This part contains criteria and requirements for ambient air quality monitoring and requirements for reporting ambient air quality data and 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.

(b) The requirements pertaining to provisions for an air quality surveillance system in the State Implementation Plan 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. This network will be operated by the States and will consist of certain selected stations from the States' SLAMS networks. These selected stations will remain as SLAMS and will continue to meet any applicable requirements on SLAMS. The stations, however, will also be designated as National Air Monitoring Stations (NAMS) and will be subject to additional data reporting and monitoring methodology requirements as contained in subpart D of this part.

(d) This section also acts to establish a Photochemical Assessment Monitoring Stations (PAMS) network as a subset of the State's SLAMS network for the purpose of enhanced monitoring in O_3 nonattainment areas listed as serious, severe, or extreme. The PAMS network will be subject to the data reporting and monitoring methodology requirements as contained in subpart E of this part.

(e) Requirements for the daily reporting of an index of ambient air quality, to insure that the population of major urban areas are informed daily of local air quality conditions, are also included in this part.

[44 FR 27571, May 10, 1979, as amended at 58 FR 8467, Feb. 12, 1993]

§58.3 Applicability.

This part applies to:

(a) State air pollution control agencies.

(b) Any local air pollution control agency or Indian governing body 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 Criteria

§58.10 Quality assurance.

(a) Appendix A to this part contains quality assurance criteria to be followed when operating the SLAMS network.

(b) Appendix B to this part contains the quality assurance criteria to be followed by the owner or operator of a proposed source when operating a PSD station.

§58.11 Monitoring methods.

Appendix C to this part contains the criteria to be followed in determining acceptable monitoring methods or instruments for use in SLAMS.

§58.12 Siting of instruments or instrument probes.

Appendix E to this part contains criteria for siting instruments or instrument probes for SLAMS.

§58.13 Operating schedule.

Ambient air quality data collected at any SLAMS must be collected as follows:

(a) For continuous analyzers—consecutive hourly averages except during:

(1) Periods of routine maintenance,

(2) Periods of instrument calibration, or

(3) Periods or seasons exempted by the Regional Administrator.

(b) For manual methods (excluding PM10 samplers and PAMS VOC samplers), at least one 24-hour sample must be obtained every sixth day except during periods or seasons exempted by the Regional Administrator.

(c) For PAMS VOC samplers, samples must be obtained as specified in sections 4.3 and 4.4 of appendix D to this part. Area-specific PAMS operating schedules must be included as part of the network description required by §58.40 and must be approved by the Administrator.

(d) For PM_{10} samplers—a 24-hour sample must be taken from midnight to midnight (local time) to ensure national consistency. The sampling shall be conducted on the following schedules which are based on either the first year of PM_{10} monitoring or a long-term selective PM_{10} monitoring plan:

(1) *First year PM_{10} monitoring.* The sampling frequency for the first year (12 consecutive months) of ambient PM_{10} monitoring shall be based on the monitoring area's SIP area grouping (I, II, III) which is described in the PM_{10} SIP Development Guideline and the Preamble to part 51 of this chapter. In general, the SIP groupings are defined in terms of the estimated probability of not attaining the PM_{10} NAAQS. Procedures to develop these probabilities are found in Pace, T., et al. ''Procedures for Estimating Probability of Nonattainment of a PM_{10} NAAQS Using Total Suspended Particulate or Inhalable Particulate Data.'' OAQPS, U.S. Environmental Protection Agency, Research Triangle Park, N. C. December 1986. The most recent 3 calendar years of air quality data must be used in this determination. The SIP area groupings are divided into three categories: Group I—areas whose probability is greater than or equal to 95

percent; Group II—areas whose probability is greater than or equal to 20 percent to less than 95 percent probability, and Group III—areas whose probability is less than 20 percent. The use of the term ''monitoring area'' as it applies to the required sampling frequencies of the ''monitoring area'' is as follows: First, any urbanized area as defined by the U.S. Bureau of Census; second, any incorporated place such as a city or town as defined by the U.S.Bureau of Census or group of cities or towns; and third, any ''monitoring area'' designated by the responsible air pollution control agency. In designating these latter ''monitoring areas'', the control agency should consider technical factors such as the types of emissions, their spatial distribution, meteorology, and topography and how these factors contribute to the uniqueness of the ''monitoring area'' thereby distinguishing it from other designated ''monitoring areas''. The starting date for this first year of PM_{10} monitoring may begin prior to the effective date of promulgation of this regulation.

(i) For Group I areas, everyday PM_{10} sampling is required for at least one PM_{10} site which must be located in the area of expected maximum concentration. The remainder require every sixth day sampling.

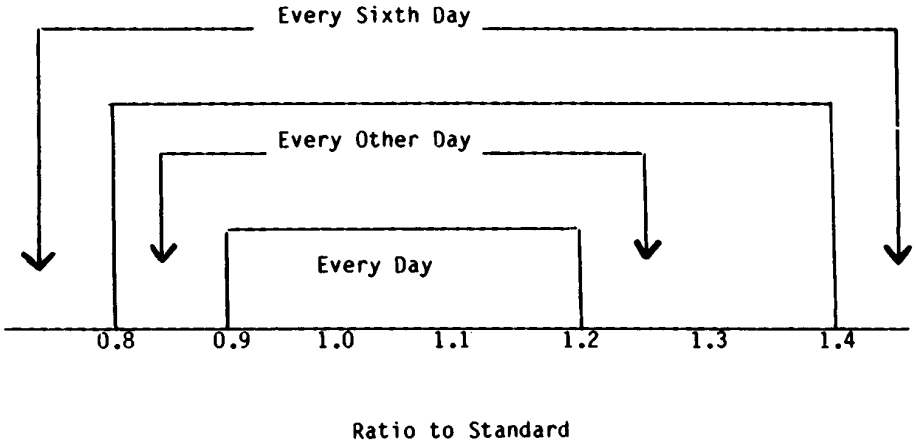
(ii) For Group II areas, every other day sampling is required for at least one PM_{10} site which must be located in the area of expected maximum concentration. The remainder require every sixth day sampling.

(iii) For Group III areas, a minimum of one in six day sampling is required.

If a monitoring site in a Group III or Group II area later records levels exceeding the short term (24-hour) PM_{10} NAAQS, as described in part 50 appendix K, and the monitoring frequency was less than everyday, then everyday sampling must be initiated in the area of expected maximum concentration no later than 90 days following the end of the calendar quarter in which the exceedance occurred and continue for the subsequent four calender quarters.

(2) *Long term monitoring selective sampling.* To be eligible for the long term selective sampling plan, the first year of PM_{10} sampling, or its equivalent, must be conducted. A complete year comprises all four calendar quarters with each quarter containing data from 75 percent of the scheduled sampling days. The equivalent to one year of PM_{10} sampling to be completed within one year of the effective date of promulgation is defined as follows: First, for everyday sampling: 2 years of every other day sampling or 2 years of every sixth day sampling and 1 year of every other day sampling or 3 years of every sixth day sampling; second, for every other day sampling: 3 years of every sixth day sampling. After one year of PM_{10} monitoring or it's equivalent has been obtained, 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 level of the controlling standard. For those areas in which the short-term (24–hour) standard is controlling i.e., has the highest ratio, the selective sampling requirements are illustrated in Figure 1. If the operating agency were able to demonstrate, by a combination of historical TSP data and at least one year of PM_{10} data that there were certain periods of the year where 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 revert back to once in six days. The minimum sampling schedule for all other sites in the area would be once every six days. For those areas in which the annual standard is the controlling standard, the minimum sampling schedule for all monitors in the area would be once every six days. During the annual review of the SLAMS network, the most recent year of data must be considered to estimate the air quality status for the controlling air quality standard (24–hour or annual). 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, N.C., January 1979, should be used. Adjustments to the monitoring schedule must be made on the basis of the annual review. 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 three years of data might in some cases, be justified in order to provide a more representative data base from which to estimate current air quality status and to provide stability to the network. This multiyear consideration would reduce the possibility of an anamalous 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 alternate site must be submitted to the Regional Office for approval during the annual review process. It should be noted that minimum data completeness critieria, number of years of data and sampling frequency for judging attainment of the NAAQS are discussed in appendix K of part 50.



[44 FR 27571, May 10, 1979, as amended at 52 FR 24739, July 1, 1987; 58 FR 8467, Feb. 12, 1993]

§58.14 Special purpose monitors.

(a) Any ambient air quality monitoring station other than a SLAMS or PSD station from which the State intends to use the data as part of a demonstration of attainment or nonattainment or in computing a design value for control purposes of the National Ambient Air Quality Standards (NAAQS) must meet the requirements for SLAMS described in §58.22 and, after January 1, 1983, must also meet the requirements for SLAMS as described in §58.13 and appendices A and E to this part.

(b) Any ambient air quality monitoring station other than a SLAMS or PSD station from which the State intends to use the data for SIP-related functions other than as described in paragraph (a) of this section is not necessarily required to comply with the requirements for a SLAMS station under paragraph (a) but must be operated in accordance with a monitoring schedule, methodology, quality assurance procedures, and probe or instrument-siting specifications approved by the Regional Administrator.

[46 FR 44164, Sept. 3, 1981]

Subpart C—State and Local Air Monitoring Stations (SLAMS)

§ 58.20 Air quality surveillance: Plan content.

By January 1, 1980, the State shall adopt and submit to the Administrator a revision to the plan which will:

(a) Provide for the establishment of an air quality surveillance system that consists of a network of monitoring stations designated as State and Local Air Monitoring Stations (SLAMS) which measure ambient concentrations of those pollutants for which standards have been established in part 50 of this chapter. SLAMS (including NAMS) designated as PAMS will also obtain ambient concentrations of speciated VOC and NO_X, and meteorological measurements. PAMS may therefore be located at existing SLAMS or NAMS sites when appropriate.

(b) Provide for meeting the requirements of appendices A, C, D, and E to this part.

(c) Provide for the operation of at least one SLAMS per criteria pollutant except Pb during any stage of an air pollution episode as defined in the plan.

(d) Provide for the review of the air quality surveillance system on an annual basis to determine if the system meets the monitoring objectives defined in appendix D to this part. Such review must identify needed modifications to the network such as termination or relocation of unnecessary stations or establishment of new stations which are necessary.

(e) Provide for having a SLAMS network description available for public inspection and submission to the Administrator upon request. The network description must be available at the time of plan revision submittal except for Pb which must be available by December 1, 1981 and for PM_{10} monitors which must be available by 6 months after the effective date of promulgation and must contain the following information for each SLAMS:

(1) The AIRS site identification form for existing stations.

(2) The proposed location for scheduled stations.

(3) The sampling and analysis method.

(4) The operating schedule.

(5) The monitoring objective and spatial scale of representativeness as defined in appendix D to this part.

(6) A schedule for: (i) Locating, placing into operation, and making available the AIRS site identification form for each SLAMS which is not located and operating at the time of plan revision submittal, (ii) implementing quality assurance procedures of appendix A to this part for each SLAMS for which such procedures are not implemented at the time of plan revision submittal, and (iii) resiting each SLAMS which does not meet the requirements of appendix E to this part at the time of plan revision submittal.

(f) Within 9 months after;

(1) February 12, 1993; or

(2) Date of redesignation or reclassification of any existing O_3 nonattainment area to serious, severe, or extreme; or

(3) The designation of a new area and classification to serious, severe, or extreme, affected States shall adopt and submit a plan revision to the Administrator.

The plan revision will provide for the establishment and maintenance of PAMS. Each PAMS site will provide for the monitoring of ambient concentrations of criteria pollutants (O_3, NO_2), and non-criteria pollutants (NO_X, NO, and speciated VOC) as stipulated in section 4.2 of appendix D, and meteorological measurements. The PAMS network is part of the SLAMS network, and the plan provisions in paragraphs (a) through (f) of this section will apply to the revision. Since NAMS sites are also part of the SLAMS network, some PAMS sites may be coincident with NAMS sites and may be designated as both PAMS and NAMS.

[44 FR 27571, May 10, 1979, as amended at 46 FR 44164, Sept. 3, 1981; 52 FR 24740, July 1, 1987; 58 FR 8467, Feb. 12, 1993; 59 FR 41628, Aug. 12, 1994]

§ 58.21 SLAMS network design.

The design criteria for SLAMS contained in appendix D to this part must be used in designing the SLAMS network. The State shall consult with the Regional Administrator during the network design process. The final network

design will be subject to the approval of the Regional Administrator.

§58.22 SLAMS methodology.

Each SLAMS must meet the monitoring methodology requirements of appendix C to this part at the time the station is put into operation as a SLAMS.

§58.23 Monitoring network completion.

By January 1, 1983, with the exception of PM_{10} samplers whose probability of nonattainment of the PM_{10} ambient standard is greater than or equal to 20 percent which shall be by 1 year after the effective date of promulgation and the remaining PM_{10} samplers which shall be by 2 years after the effective date of promulgation:

(a) Each station in the SLAMS network must be in operation, be sited in accordance with the criteria in appendix E to this part, and be located as described on the station's AIRS site identification form, and

(b) The quality assurance requirements of appendix A to this part must be fully implemented.

[44 FR 27571, May 10, 1979, as amended at 52 FR 24740, July 1, 1987; 59 FR 41628, Aug. 12, 1994]

§58.24 [Reserved]

§58.25 System modification.

The State shall annually develop and implement a schedule to modify the ambient air quality monitoring network to eliminate any unnecessary stations or to correct any inadequacies indicated by the result of the annual review required by §58.20(d). The State shall consult with the Regional Administrator during the development of the schedule to modify the monitoring program. The final schedule and modifications will be subject to the approval of the Regional Administrator. Nothing in this section will preclude the State, with the approval of the Regional Administrator, from making modifications to the SLAMS network for reasons other than those resulting from the annual review.

§58.26 Annual SLAMS summary report.

(a) The State shall submit to the Administrator (through the appropriate Regional Office) an annual summary report of all the ambient air quality monitoring data from all monitoring stations designated State and Local Air Monitoring Stations (SLAMS). The annual report must be submitted by July 1 of each year for data collected from January 1 to December 31 of the previous year.

(b) The annual summary report must contain:

(1) The information specified in appendix F,

(2) The location, date, pollution source, and duration of each incident of air pollution during which ambient levels of a pollutant reached or exceeded the level specified by §51.16(a) of this chapter as a level which could cause significant harm to the health of persons.

(c) The senior air pollution control officer in the State or his designee shall certify that the annual summary report is accurate to the best of his knowledge.

[44 FR 27571, May 10, 1979, as amended at 51 FR 9586, Mar. 19, 1986]

§58.27 Compliance date for air quality data reporting.

The annual air quality data reporting requirements of §58.26 apply to data collected after December 31, 1980. Data collected before January 1, 1981, must be reported under the reporting procedures in effect before the effective date of subpart C of this part.

§58.28 SLAMS data submittal.

The State shall submit all of the SLAMS data according to the same data submittal requirements as defined for NAMS in section 58.35. The State shall also submit any portion or all of the SLAMS data to the appropriate Regional Administrator upon request.

[59 FR 41628, Aug. 12, 1994]

Subpart D—National Air Monitoring Stations (NAMS)

§ 58.30 NAMS network establishment.

(a) By January 1, 1980, with the exception of Pb, which shall be by December 1, 1981, and PM_{10} samplers, which shall be by 6 months after the effective date of promulgation, the State shall:

(1) Establish, through the operation of stations or through a schedule for locating and placing stations into operation, that portion of a National Ambient Air Quality Monitoring Network which is in that State, and

(2) Submit to the Administrator (through the appropriate Regional Office) a description of that State's portion of the network.

(b) Hereinafter, the portion of the national network in any State will be referred to as the NAMS network.

(c) The stations in the NAMS network must be stations from the SLAMS network required by § 58.20.

(d) The requirements of appendix D to this part must be met when designing the NAMS network. The process of designing the NAMS network must be part of the process of designing the SLAMS network as explained in appendix D to this part.

[44 FR 27571, May 10, 1979, as amended at 46 FR 44164, Sept. 3, 1981; 52 FR 24740, July 1, 1987]

§ 58.31 NAMS network description.

The NAMS network description required by § 58.30 must contain the following for all stations, existing or scheduled:

(a) The AIRS site identification form for existing stations.

(b) The proposed location for scheduled stations.

(c) Identity of the urban area represented.

(d) The sampling and analysis method.

(e) The operating schedule.

(f) The monitoring objective and spatial scale of representativeness as defined in appendix D to this part.

(g) A schedule for:

(1) Locating, placing into operation, and submitting the AIRS site identification form for each NAMS which is not located and operating at the time of network description submittal,

(2) Implementing quality assurance procedures of appendix A to this part for each NAMS for which such procedures are not implemented at the time of network description submittal, and

(3) Resiting each NAMS which does not meet the requirements of appendix E to this part at the time of network description submittal.

[44 FR 27571, May 10, 1979, as amended at 59 FR 41628, Aug. 12, 1994]

§ 58.32 NAMS approval.

The NAMS network required by § 58.30 is subject to the approval of the Administrator. Such approval will be contingent upon completion of the network description as outlined in § 58.31 and upon conformance to the NAMS design criteria contained in appendix D to this part.

§ 58.33 NAMS methodology.

Each NAMS must meet the monitoring methodology requirements of appendix C to this part applicable to NAMS at the time the station is put into operation as a NAMS.

§ 58.34 NAMS network completion.

By January 1, 1981, with the exception of Pb, which shall be by July 1, 1982 and PM_{10} samplers, which shall be by 1 year after the effective date of promulgation:

(a) Each NAMS must be in operation, be sited in accordance with the criteria in appendix E to this part, and be located as described in the station's AIRS site identification form; and

(b) The quality assurance requirements of appendix A to this part must be fully implemented for all NAMS.

[44 FR 27571, May 10, 1979, as amended at 46 FR 44164, Sept. 3, 1981; 52 FR 24740, July 1, 1987; 59 FR 41628, Aug. 12, 1994]

§ 58.35 NAMS data submittal.

(a) The requirements of this section apply to those stations designated as both SLAMS and NAMS by the network description required by §§ 58.20 and 58.30.

(b) The State shall report to the Administrator all ambient air quality data for SO_2, CO, O_3, NO_2, Pb, and PM-

10 and information specified by the AIRS Users Guide (Volume II, Air Quality Data Coding, and Volume III, Air Quality Data Storage) to be coded into the AIRS–AQS format. Such air quality data and information must be submitted directly to the AIRS–AQS via either electronic transmission or magnetic tape, in the format of the AIRS–AQS, and in accordance with the quarterly schedule described in paragraph (c) of this section.

(c) 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:

(1) Contain all data and information gathered during the reporting period.

(2) Be received in the AIRS–AQS within 90 days after the end of the quarterly reporting period. For example, the data for the reporting period January 1-March 31, 1994 are due on or before June 30, 1994.

(d) Air quality data submitted for each reporting period must be edited, validated, and entered into the AIRS–AQS for updating (within the time limits specified in paragraph (c) of this section) pursuant to appropriate AIRS–AQS procedures. The procedures for editing and validating data are described in the AIRS Users Guide, Volume II Air Quality Data Coding.

(e) This section does not permit a State to exempt those SLAMS which are also designated as NAMS from all or any of the reporting requirements applicable to SLAMS in §58.26.

[44 FR 27571, May 10, 1979, as amended at 46 FR 44164, Sept. 3, 1981; 51 FR 9586, Mar. 19, 1986; 52 FR 24740, July 1, 1987; 59 FR 41628, Aug. 12, 1994]

§58.36 System modification.

During the annual SLAMS Network Review specified in §58.20, any changes to the NAMS network identified by the EPA and/or proposed by the State and agreed to by the EPA will be evaluated. These modifications should address changes invoked by a new census and changes to the network due to changing air quality levels, emission patterns, etc. The State shall be given one year (until the next annual evaluation) to implement the appropriate changes to the NAMS network.

[51 FR 9586, Mar. 19, 1986]

Subpart E—Photochemical Assessment Monitoring Stations (PAMS)

SOURCE: 58 FR 8468, Feb. 12, 1993, unless otherwise noted.

§58.40 PAMS network establishment.

(a) In addition to the plan revision, the State shall submit a photochemical assessment monitoring network description including a schedule for implementation to the Administrator within 6 months after;

(1) February 12, 1993; or

(2) Date of redesignation or reclassification of any existing O_3 nonattainment area to serious, severe, or extreme; or

(3) The designation of a new area and classification to serious, severe, or extreme O_3 nonattainment.

The network description will apply to all serious, severe, and extreme O_3 nonattainment areas within the State. Some O_3 nonattainment areas may extend beyond State or Regional boundaries. In instances where PAMS network design criteria as defined in appendix D to this part require monitoring stations located in different States and/or Regions, the network description and implementation schedule should be submitted jointly by the States involved. When appropriate, such cooperation and joint network design submittals are preferred. Network descriptions shall be submitted through the appropriate Regional Office(s). Alternative networks, including different monitoring schedules, periods, or methods, may be submitted, but they must include a demonstration that they satisfy the monitoring data uses and fulfill the PAMS monitoring objectives described in sections 4.1 and 4.2 of appendix D to this part.

(b) For purposes of plan development and approval, the stations established or designated as PAMS must be stations from the SLAMS network or become part of the SLAMS network required by §58.20.

(c) The requirements of appendix D to this part applicable to PAMS must be met when designing the PAMS network.

§ 58.41 PAMS network description.

The PAMS network description required by § 58.40 must contain the following:

(a) Identification of the monitoring area represented.

(b) The AIRS site identification form for existing stations.

(c) The proposed location for scheduled stations.

(d) Identification of the site type and location within the PAMS network design for each station as defined in appendix D to this part except that during any year, a State may choose to submit detailed information for the site scheduled to begin operation during that year's PAMS monitoring season, and defer submittal of detailed information on the remaining sites until succeeding years. Such deferred network design phases should be submitted to EPA for approval no later than January 1 of the first year of scheduled operation. As a minimum, general information on each deferred site should be submitted each year until final approval of the complete network is obtained from the Administrator.

(e) The sampling and analysis method for each of the measurements.

(f) The operating schedule for each of the measurements.

(g) An O_3 event forecasting scheme, if appropriate.

(h) A schedule for implementation. This schedule should include the following:

(1) A timetable for locating and submitting the AIRS site identification form for each scheduled PAMS that is not located at the time of submittal of the network description;

(2) A timetable for phasing-in operation of the required number and type of sites as defined in appendix D to this part; and

(3) A schedule for implementing the quality assurance procedures of appendix A to this part for each PAMS.

§ 58.42 PAMS approval.

The PAMS network required by § 58.40 is subject to the approval of the Administrator. Such approval will be contingent upon completion of each phase of the network description as outlined in § 58.41 and upon conformance to the PAMS network design criteria contained in appendix D to this part.

§ 58.43 PAMS methodology.

PAMS monitors must meet the monitoring methodology requirements of appendix C to this part applicable to PAMS.

§ 58.44 PAMS network completion.

(a) The complete, operational PAMS network will be phased in as described in appendix D to this part over a period of 5 years after;

(1) February 12, 1993; or

(2) Date of redesignation or reclassification of any existing O_3 nonattainment area to serious, severe, or extreme; or

(3) The designation of a new area and classification to serious, severe, or extreme O_3 nonattainment.

(b) The quality assurance criteria of appendix A to this part must be implemented for all PAMS.

§ 58.45 PAMS data submittal.

(a) The requirements of this section apply only to those stations designated as PAMS by the network description required by § 58.40.

(b) All data shall be submitted to the Administrator in accordance with the format, reporting periods, reporting deadlines, and other requirements as specified for NAMS in § 58.35.

(c) The State shall report NO and NO_X data consistent with the requirements of § 58.35 for criteria pollutants.

(d) The State shall report VOC data and meteorological data within 6 months following the end of each quarterly reporting period.

§ 58.46 System modification.

(a) Any proposed changes to the PAMS network description will be evaluated during the annual SLAMS Network Review specified in § 58.20. Changes proposed by the State must be approved by the Administrator. The State will be allowed 1 year (until the next annual evaluation) to implement

the appropriate changes to the PAMS network.

(b) PAMS network requirements are mandatory only for serious, severe, and extreme O_3 nonattainment areas. When any such area is redesignated to attainment, the State may revise its PAMS monitoring program subject to approval by the Administrator.

Subpart F—Air Quality Index Reporting

§ 58.50 Index reporting.

(a) The State shall report to the general public on a daily basis through prominent notice an air quality index in accordance with the requirements of appendix G to this part.

(b) Reporting must commence by January 1, 1981, for all urban areas with a population exceeding 500,000, and by January 1, 1983, for all urban areas with a population exceeding 200,000.

(c) The population of an urban area for purposes of index reporting is the most recent U.S. census population figure as defined in § 58.1 paragraph (s).

[44 FR 27571, May 10, 1979, as amended at 51 FR 9586, Mar. 19, 1986. Redesignated at 58 FR 8467, Feb. 12, 1993]

Subpart G—Federal Monitoring

SOURCE: 44 FR 27571, May 10, 1979. Redesignated at 58 FR 8467, Feb. 12, 1993.

§ 58.60 Federal monitoring.

The Administrator may locate and operate an ambient air monitoring station if the State fails to locate, or schedule to be located, during the initial network design process or as a result of the annual review required by § 58.20(d):

(a) A SLAMS at a site which is necessary in the judgment of the Regional Administrator to meet the objectives defined in appendix D to this part, or

(b) A NAMS at a site which is necessary in the judgment of the Administrator for meeting EPA national data needs.

§ 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 a National Ambient Air Quality Standard 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.

APPENDIX A TO PART 58—QUALITY ASSURANCE REQUIREMENTS FOR STATE AND LOCAL AIR MONITORING STATIONS (SLAMS)

1. *General Information*

This appendix specifies the minimum quality assurance requirements applicable to SLAMS air monitoring data submitted to EPA. States are encouraged to develop and maintain quality assurance programs more extensive than the required minimum.

Quality assurance of air monitoring systems includes two distinct and important interrelated functions. One function is the control of the measurement process through the implementation of policies, procedures, and corrective actions. The other function is the assessment of the quality of the monitoring data (the product of the measurement process). In general, the greater the effort effectiveness of the control of a given monitoring system, the better will be the resulting quality of the monitoring data. The results of data quality assessments indicate whether the control efforts need to be increased.

Documentation of the quality assessments of the monitoring data is important to data users, who can then consider the impact of the data quality in specific applications (see Reference 1). Accordingly, assessments of SLAMS data quality are required to be reported to EPA periodically.

To provide national uniformity in this assessment and reporting of data quality for all SLAMS networks, specific assessment and reporting procedures are prescribed in detail in sections 3, 4, and 5 of this appendix.

In contrast, the control function encompasses a variety of policies, procedures, specifications, standards, and corrective measures which affect the quality of the resulting data. The selection and extent of the quality control activities—as well as additional quality assessment activities—used by a monitoring agency depend on a number of local factors such as the field and laboratory conditions, the objectives of the monitoring, the level of the data quality needed, the expertise of assigned personnel, the cost of control procedures, pollutant concentration levels, etc. Therefore, the quality assurance requirements, in section 2 of this appendix, are specified in general terms to allow each State to develop a quality assurance system

that is most efficient and effective for its own circumstances.

2. *Quality Assurance Requirements*

2.1 Each State must develop and implement a quality assurance program consisting of policies, procedures, specifications, standards and documentation necessary to:

(1) Provide data of adequate quality to meet monitoring objectives, and

(2) Minimize loss of air quality data due to malfunctions or out-ot-control conditions.

This quality assurance program must be described in detail, suitably documented, and approved by the appropriate Regional Administrator, or his designee. The Quality Assurance Program will be reviewed during the annual system audit described in section 2.4.

2.2 Primary guidance for developing the quality assurance program is contained in References 2 and 3, which also contain many suggested procedures, checks, and control specifications. Section 2.0.9 of Reference 3 describes specific guidance for the development of a Quality Assurance Program for SLAMS automated analyzers. Many specific quality control checks and specifications for manual 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 (see Reference 4). Similarly, quality control procedures related to specifically designated reference and equivalent analyzers are contained in the respective operation and instruction manuals associated with those analyzers. Quality assurance guidance for meteorological systems at PAMS is contained in reference 3. Quality assurance procedures for VOC, NO_X (including NO and NO_2), O_3, and carbonyl measurements at PAMS must be consistent with EPA guidance. This guidance, and any other pertinent information from appropriate sources, should be used by the States in developing their quality assurance programs.

As a minimum, each quality assurance program must include operational procedures for each of the following activities:

(1) Selection of methods, analyzers, or samplers;

(2) Training;

(3) Installation of equipment;

(4) Selection and control of calibration standards;

(5) Calibration;

(6) Zero/span checks and adjustments of automated analyzers;0

(7) Control checks and their frequency;

(8) Control limits for zero, span and other control checks, and respective corrective actions when such limits are surpassed;

(9) Calibration and zero/span checks for multiple range analyzers (see section 2.6 of appendix C of this part);

(10) Preventive and remedial maintenance;

(11) Quality control procedures for air pollution episode monitoring;

(12) Recording and validating data;

(13) Data quality assessment (precision and accuracy);

(14) Documentation of quality control information.

2.3 Pollutant Concentration and Flow Rate Standards.

2.3.1 Gaseous pollutant concentration standards (permeation devices or cylinders of compressed gas) used to obtain test concentration for CO, SO_2, and NO_2 must be traceable to either a National Institute of Standards and Technology (NIST) Standard Reference Material (SRM) or an NIST/EPA-approved commercially available Certified Reference Material (CRM). CRM's are described in Reference 5, and a list of CRM sources is available from the Quality Assurance Division (MD–77), Atmospheric Research and Exposure Assessment Laboratory, U.S. Environmental Protection Agency, Research Triangle Park, NC 27711.

General guidance and recommended techniques for certifying gaseous working standards against an SRM or CRM are provided in section 2.0.7 of Reference 3. Direct use of a CRM as a working standard is acceptable, but direct use of an NIST SRM as a working standard is discouraged because of the limited supply and expense of SRMs.

2.3.2 Test concentrations for O_3 must be obtained in accordance with the UV photometric calibration procedure specified in appendix D of part 50 of this chapter, or by means of a certified ozone transfer standard. Consult References 6 and 7 for guidance on primary and transfer standards for O_3.

2.3.3 Flow rate measurements must be made by a flow measuring instrument that is traceable to an authoritative volume or other standard. Guidance for certifying some types of flowmeters is provided in Reference 3.

2.4 National Performance and System Audit Programs. Agencies operating SLAMS network stations shall be subject to annual EPA systems audits of their ambient air monitoring program and are required to participate in EPA's National Performance Audit Program. These audits are described in section 1.4.16 of Reference 2 and section 2.0.11 of Reference 3. For instructions, agencies should contact either the appropriate EPA Regional Quality Assurance Coordinator or the Quality Assurance Division (MD–77B), Atmospheric Research and Exposure Assessment Laboratory, U.S. Environmental Protection Agency, Research Triangle Park, NC 27711.

3. *Data Quality Assessment Requirements*

All ambient monitoring methods or analyzers used in SLAMS shall be tested periodically, as described in this section 3, to quantitatively assess the quality of the SLAMS

data being routinely produced. Measurement accuracy and precision are estimated for both automated and manual methods. The individual results of these tests for each method or analyzer shall be reported to EPA as specified in section 4. EPA will then calculate quarterly integrated estimates of precision and accuracy applicable to the SLAMS data as described in section 5. Data assessment results should be reported to EPA only for methods and analyzers approved for use in SLAMS monitoring under appendix C of this part.

The integrated data quality assessment estimates will be calculated on the basis of ''reporting organizations.'' A reporting organization is defined as a State, subordinate organization within a State, or other organization that is responsible for a set of stations that monitor the same pollutant and for which precision or accuracy assessments can be pooled. States must define one or more reporting organizations for each pollutant such that each monitoring station in the State SLAMS network is included in one, and only one, reporting organization.

Each reporting organization shall be defined such that precision or accuracy 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 States in defining reporting organizations include: (1) operation by a common team of field operators, (2) common calibration facilities, and (3) support by a common laboratory or headquarters. Where there is uncertainty in defining the reporting organizations or in assigning specific sites to reporting organizations, States shall consult with the appropriate EPA Regional Office for guidance. All definitions of reporting organizations shall be subject to final approval by the appropriate EPA Regional Office.

Assessment results shall be reported as specified in section 4. Concentration and flow standards must be as specified in sections 2.3 or 3.4. In addition, working standards and equipment used for accuracy audits must not be the same standards and equipment used for routine calibrations. Additional information and guidance in the technical aspects of conducting these tests may be found in Reference 3 or in the operation or instruction manual associated with the analyzer or sampler. Concentration measurements reported from analyzers or analytical systems (indicated concentrations) should be based on stable readings and must be derived by means of the same calibration curve and data processing system used to obtain the routine air monitoring data (see Reference 1 and Reference 3, section 2.0.9.1.3(d)). Table A–1 provides a summary of the minimum data quality assessment requirements, which are described in more detail in the following sections.

3.1 Precision of Automated Methods. A one-point precision check must be carried out at least once every two weeks on each automated analyzer used to measure SO_2, NO_2, O_3, and CO. The precision check is made by challenging the analyzer with a precision check gas of known concentration (effective concentration for open path analyzers) between 0.08 and 0.10 ppm for SO_2, NO_2, and O_3 analyzers, and between 8 and 10 ppm for CO analyzers. To check the precision of SLAMS analyzers operating on ranges higher than 0 to 1.0 ppm SO_2, NO_2, and O_3, or 0 to 100 ppm for CO, use precision check gases of appropriately higher concentration as approved by the appropriate Regional Administrator or the Regional Administrator's designee. However, the results of precision checks at concentration levels other than those specified above do not need be reported to the EPA. The standards from which precision check test concentrations are obtained must meet the specifications of section 2.3.

Except for certain CO analyzers described below, point analyzers must operate in their normal sampling mode during the precision 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 precision 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 precision check is made in conjunction with a zero or span adjustment, it must be made prior to such zero or span adjustments. Randomization of the precision check with respect to time of day, day of week, and routine service and adjustment is encouraged where possible.

Open path analyzers are tested by inserting a test cell containing a precision 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 precision check gas in the test cell must be selected to produce an ''effective concentration'' in the range specified above. Generally, the precision test concentration measurement will be

the sum of the atmospheric pollutant concentration and the precision 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 precision check test from the precision test 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.

Report the actual concentration (effective concentration for open path analyzers) of the precision check gas and the corresponding concentration measurement (corrected concentration, if applicable, for open path analyzers) indicated by the analyzer. The percent differences between these concentrations are used to assess the precision of the monitoring data as described in section 5.1.

3.2 Accuracy of Automated Methods. Each calendar quarter (during which analyzers are operated), audit at least 25 percent of the SLAMS analyzers that monitor for SO_2, NO_2, O_3, or CO such that each analyzer is audited at least once per year. If there are fewer than four analyzers for a pollutant within a reporting organization, randomly reaudit one or more analyzers so that at least one analyzer for that pollutant is audited each calendar quarter. Where possible, EPA strongly encourages more frequent auditing, up to an audit frequency of once per quarter for each SLAMS analyzer.

The audit is made by challenging the analyzer with at least one audit gas of known concentration (effective concentration for open path analyzers) from each of the following ranges that fall within the measurement range of the analyzer being audited:

Audit level	Concentration range, ppm		CO
	SO_2, O_3	NO_2	
1	0.03–0.08	0.03–0.08	3–8
2	0.15–0.20	0.15–0.20	15–20
3	0.35–0.45	0.35–0.45	35–45
4	0.80–0.90	.....	80–90

NO_2 audit gas for chemiluminescence-type NO_2 analyzers must also contain at least 0.08 ppm NO.

NOTE: NO concentrations substantially higher than 0.08 ppm, as may occur when using some gas phase titration (GPT) techniques, may lead to audit 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.

To audit SLAMS analyzers operating on ranges higher than 0 to 1.0 ppm for SO_2, NO_2, and O_3 or 0 to 100 ppm for CO, use audit gases of appropriately higher concentration as approved by the appropriate Regional Administrator or his designee. The results of audits at concentration levels other than those shown in the above table need not be reported to EPA.

The standards from which audit gas test concentrations are obtained must meet the specifications of section 2.3. Working or transfer standards and equipment used for auditing must not be the same as the standards and equipment used for calibration and spanning, but may be referenced to the same NIST SRM, CRM, or primary UV photometer. The auditor should not be the operator or analyst who conducts the routine monitoring, calibration, and analysis.

For point analyzers, the audit shall be carried out by allowing the analyzer to analyze the audit 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 3.1 for certain CO analyzer does not apply for audits.

Open path analyzers are audited 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 audit, and the normal monitoring configuration of the instrument should be modified as little as possible to accommodate the test cell for the audit. 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 ranges specified in this section 3.2. Generally, each audit concentration measurement result will be the sum of the atmospheric pollutant concentration and the audit 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 audit test (or preferably before and after each audit concentration level) from the audit 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 audited during periods when the atmospheric pollutant concentrations are relatively low and steady. Also, the monitoring path length must be reverified to within ±3 percent to validate the audit, since the monitoring path length is critical to the determination of the effective concentration.

Report both the audit test concentrations (effective concentrations for open path analyzers) and the corresponding concentration measurements (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 accuracy of the monitoring data as described in section 5.2.

3.3 Precision of Manual Methods. For each network of manual methods, select one or more monitoring sites within the reporting organization for duplicate, collocated sampling as follows: for 1 to 5 sites, select 1 site; for 6 to 20 sites, select 2 sites; and for over 20 sites, select 3 sites. Where possible, additional collocated sampling is encouraged. For particulate matter, a network for measuring PM_{10} shall be separate from a TSP network. 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, alternate sites approved by the Regional Administrator may be selected.

In determining the number of collocated sites required, monitoring networks for Pb should be treated independently from networks for particulate matter, 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 lead site and a collocated particulate matter site may serve as a collocated site for both networks.

The two collocated samplers must be within 4 meters of each other, and particulate matter samplers must be at least 2 meters apart 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.

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 duplicate sampler. Each duplicate sampler must be operated concurrently with its associated routine sampler at least once per week. The operation schedule should be selected so that the sampling days are distributed evenly over the year and over the seven days of the week. The every-6-day schedule used by many monitoring agencies is recommended. Report the measurements from both samplers at each collocated sampling site, including measurements falling below the limits specified in 5.3.1. The percent differences in measured concentration ($\mu g/m^3$) between the two collocated samplers are used to calculate precision as described in section 5.3.

3.4 Accuracy of Manual Methods. The accuracy of manual sampling methods is assessed by auditing a portion of the measurement process. For particulate matter methods, the flow rate during sample collection is audited. For SO_2 and NO_2 methods, the analytical measurement is audited. For Pb methods, the flow rate and analytical measurement are audited.

3.4.1 Particulate Matter Methods. Each calendar quarter, audit the flow rate of at least 25 percent of the samplers such that each sampler is audited at least once per year. If there are fewer than four samplers within a reporting organization, randomly reaudit one or more samplers so that one sampler is audited each calendar quarter. Audit each sampler at its normal operating flow rate, using a flow rate transfer standard as described in section 2.3.3. The flow rate standard used for auditing must not be the same flow rate standard used to calibrate the sampler. However, both the calibration standard and the audit standard may be referenced to the same primary flow rate standard. The flow audit should be scheduled so as to avoid interference with a scheduled sampling period. Report the audit flow rates and the corresponding flow rates indicated by the sampler's normally used flow indicator. The percent differences between these flow rates are used to calculate accuracy as described in section 5.4.1.

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.

3.4.2 SO_2 Methods. Prepare audit solutions from a working sulfite-tetrachloromercurate (TCM) solution as described in section 10.2 of the SO_2 Reference Method (appendix A of part 50 of this chapter). These audit samples must be prepared independently from the

standardized sulfite solutions used in the routine calibration procedure. Sulfite-TCM audit samples must be stored between 0 and 5 ° C and expire 30 days after preparation.

Prepare audit samples in each of the concentration ranges of 0.2–0.3, 0.5–0.6, and 0.8–0.9 μ g SO_2/ml. Analyze an audit sample in each of the three ranges at least once each day that samples are analyzed and at least twice per calendar quarter. Report the audit concentrations (in μ g SO_2/ml) and the corresponding indicated concentrations (in μ g SO_2/ml). The percent differences between these concentrations are used to calculate accuracy as described in section 5.4.2.

3.4.3 NO_2 Methods. Prepare audit solutions from a working sodium nitrite solution as described in the appropriate equivalent method (see Reference 4). These audit samples must be prepared independently from the standardized nitrite solutions used in the routine calibration procedure. Sodium nitrite audit samples expire in 3 months after preparation. Prepare audit samples in each of the concentration ranges of 0.2–0.3, 0.5–0.6, and 0.8–0.9 μ g NO_2/ml. Analyze an audit sample in each of the three ranges at least once each day that samples are analyzed and at least twice per calendar quarter. Report the audit concentrations (in μ g NO_2/ml) and the corresponding indicated concentrations (in μ g NO_2/ml). The percent differences between these concentrations are used to calculate accuracy as described in section 5.4.2.

3.4.4 Pb Methods. For the Pb Reference Method (appendix G of part 50 of this chapter), the flow rates of the high-volume Pb samplers shall be audited as part of the TSP network using the same procedures described in section 3.4.1. For agencies operating both TSP and Pb networks, 25 percent of the total number of high-volume samplers are to be audited each quarter.

Each calendar quarter, 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 1.9 cm by 20.3 cm (¾ inch by 8 inch) unexposed glass fiber filter strips 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, μ g/strip	Equivalent ambient Pb concentration,[1] μ g/m³
1	100–300	0.5–1.5
2	600–1000	3.0–5.0

[1] Equivalent ambient Pb concentration in μ g/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.

Audit samples must be extracted using the same extraction procedure used for exposed filters.

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. Report the audit concentrations (in mu;g Pb/strip) and the corresponding measured concentrations (in mu;g Pb/strip) using unit code 77. The percent differences between the concentrations are used to calculate analytical accuracy as described in section 5.4.2.

The accuracy of an equivalent Pb method is 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.

4. *Reporting Requirements*

For each pollutant, prepare a list of all monitoring sites and their AIRS site identification codes in each reporting organization and submit the list to the appropriate EPA Regional Office, with a copy to the Atmospheric Research and Exposure Assessment Laboratory (MD–75), U.S. Environmental Protection Agency, Research Triangle Park, NC 27711 (AREAL/RTP). Whenever there is a change in this list of monitoring sites in a reporting organization, report this change to the Regional Office and to AREAL/RTP.

4.1 Quarterly Reports. For each quarter, each reporting organization shall report to AIRS–AQS directly (or via the appropriate EPA Regional Office for organizations not direct users of AIRS) the results of all valid precision and accuracy tests it has carried out during the quarter. The quarterly reports of precision and accuracy data must be submitted consistent with the data reporting requirements specified for air quality data as set forth in §58.35(c). Each organization shall report all collocated measurements including those falling below the levels specified in section 5.3.1. Do not report results from invalid tests, from tests carried out during a time period for which ambient data immediately prior or subsequent to the tests were invalidated for appropriate reasons, or from tests of methods or analyzers not approved for use in SLAMS monitoring networks under appendix C of this part.

4.2 Annual Reports. When precision and accuracy estimates for a reporting organization have been calculated for all four quarters of the calendar year, EPA will calculate the properly weighted probability limits for precision and accuracy for the entire calendar year. These limits will then be associated with the data submitted in the annual SLAMS report required by §58.26.

Each reporting organization shall submit, along with its annual SLAMS report, a listing by pollutant of all monitoring sites in the reporting organization.

5. *Calculations for Data Quality Assessment*

Calculation of estimates of integrated precision and accuracy are carried out by EPA according to the following procedures. Reporting organizations should report the results of individual precision and accuracy tests as specified in sections 3 and 4 even though they may elect to carry out some or all of the calculations in this section on their own.

5.1 Precision of Automated Methods. Estimates of the precision of automated methods are calculated from the results of biweekly precision checks as specified in section 3.1. At the end of each calendar quarter, an integrated precision probability interval for all SLAMS analyzers in the organization is calculated for each pollutant.

5.1.1 Single Analyzer Precision. The percentage difference (d_i) for each precision check is calculated using equation 1, where Y_i is the concentration indicated by the analyzer for the i-th precision check and X_i is the known concentration for the i-th precision check.

$$d_i = \frac{Y_i - X_i}{X_i} \times 100 \qquad (1)$$

For each analyzer, the quarterly average (d_j) is calculated with equation 2, and the standard deviation (S_j) with equation 3, where n is the number of precision checks on the instrument made during the calendar quarter. For example, n should be 6 or 7 if precision checks are made biweekly during a quarter.

$$d_j = \frac{1}{n}\sum_{i=1}^{n} d_i \qquad (2)$$

$$S_j = \sqrt{\frac{1}{n-1}\left[\sum_{i=1}^{n} d_i^2 - \frac{1}{n}\left(\sum_{i=1}^{n} d_i\right)^2\right]} \qquad (3)$$

5.1.2 Precision for Reporting Organization. For each pollutant, the average of averages (D) and the pooled standard deviation (S_a) are calculated for all analyzers audited for the pollutant during the quarter, using either equations 4 and 5 or 4a and 5a, where k is the number of analyzers audited within the reporting organization for a single pollutant.

$$D = \frac{1}{k}\sum_{j=1}^{k} d_j \qquad (4)$$

$$D = \frac{n_1 d_1 + n_2 d_2 + \cdots + n_j d_j + \cdots + n_k d_k}{n_1 + n_2 + \cdots + n_j + \cdots + n_k} \qquad (4a)$$

$$S_a = \sqrt{\frac{1}{k}\sum_{j=1}^{k} S_j^2} \qquad (5)$$

$$S_a = \sqrt{\frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2 + \cdots + (n_j - 1)S_j^2 + \cdots + (n_k - 1)S_k^2}{n_1 + n_2 + \cdots + n_j + \cdots + n_k - k}} \qquad (5a)$$

Equations 4 and 5 are used when the same number of precision checks are made for each analyzer. Equations 4a and 5a are used to obtain a weighted average and a weighted standard deviation when different numbers of precision checks are made for the analyzers.

For each pollutant, the 95 Percent Probability Limits for the precision of a reporting organization are calculated using equations 6 and 7.

$$\text{Upper 95 Percent Probability Limit} = D + 11.96\ S_a \quad (6)$$

$$\text{Lower 95 Percent Probability Limit} = D - 1.96\ S_a \quad (7)$$

5.2 Accuracy of Automated Methods. Estimates of the accuracy of automated methods are calculated from the results of independent audits as described in section 3.2 At the end of each calendar quarter, an integrated accuracy probability interval for all SLAMS analyzers audited in the reporting organization is calculated for each pollutant. Separate probability limits are calculated for each audit concentration level in section 3.2.

5.2.1 Single Analyzer Accuracy. The percentage difference (d_i) for each audit concentration is calculated using equation 1, where Y_i is the analyzer's indicated concentration measurement from the i-th audit check and X_i is the actual concentration of the audit gas used for the i-th audit check.

5.2.2 Accuracy for Reporting Organization. For each audit concentration level, the average (D) of the individual percentage differences (d_i) for all n analyzers measuring a given pollutant audited during the quarter is calculated using equation 8.

$$D = \frac{1}{n}\sum_{i=1}^{n} d_i \quad (8)$$

For each concentration level, the standard deviation (S_a) of all the individual percentage differences for all analyzers audited during the quarter is calculated, for each pollutant, using equation 9.

$$S_a = \sqrt{\frac{1}{n-1}\left[\sum_{i=1}^{n} d_i^2 - \frac{1}{n}\left(\sum_{i=1}^{n} d_i\right)^2\right]} \quad (9)$$

For reporting organizations having four or fewer analyzers for a particular pollutant, only one audit is required each quarter, and the average and standard deviation cannot be calculated. For such reporting organizations, the audit results of two consecutive quarters are required to calculate an average and a standard deviation, using equations 8 and 9. Therefore, the reporting of probability limits shall be on a semiannual (instead of a quarterly) basis.

For each pollutant, the 95 Percent Probability Limits for the accuracy of a reporting organization are calculated at each audit concentration level using equations 6 and 7.

5.3 Precision of Manual Methods. Estimates of precision of manual methods are calculated from the results obtained from collocated samplers as described in section 3.3. At the end of each calendar quarter, an integrated precision probability interval for all collocated samplers operating in the reporting organization is calculated for each manual method network.

5.3.1 Single Sampler Precision. At low concentrations, agreement between the measurements of collocated samplers, expressed as percent differences, may be relatively poor. For this reason, collocated measurement pairs are selected for use in the precision calculations only when both measurements are above the following limits:

TSP: 20 μg/m³,
SO_2: 45 μg/m³,
NO_2: 30 μg/m³,
Pb: 0.15 μg/m³, and
PM_{10}: 20 μg/m³.

For each selected measurement pair, the percent difference (d_i) is calculated, using equation 10,

$$d_i = \frac{Y_i - X_i}{(Y_i + X_i)/2} \times 100 \qquad (10)$$

Where y_i is the pollutant concentration measurement obtained from the duplicate sampler and X_i is the concentration measurement obtained from the primary sampler designated for reporting air quality for the site. For each site, the quarterly average percent difference (d_j) is calculated from equation 2 and the standard deviation (S_j) is calculated from equation 3, where n= the number of selected measurement pairs at the site.

5.3.2 Precision for Reporting Organization. For each pollutant, the average percentage difference (D) and the pooled standard deviation (S_a) are calculated, using equations 4 and 5, or using equations 4a and 5a if different numbers of paired measurements are obtained at the collocated sites. For these calculations, the k of equations 4, 4a, 5 and 5a is the number of collocated sites.

The 95 Percent Probability Limits for the integrated precision for a reporting organization are calculated using equations 11 and 12.

Upper 95 Percent Probability Limit = $D+1.96\ S_a/\sqrt{2}$ (11)

Lower 95 Percent Probability Limit = $D-1.96\ S_a/\sqrt{2}$ (12)

5.4 Accuracy of Manual Methods. Estimates of the accuracy of manual methods are calculated from the results of independent audits as described in section 3.4. At the end of each calendar quarter, an integrated accuracy probability interval is calculated for each manual method network operated by the reporting organization.

5.4.1 Particulate Matter Samplers (including reference method Pb samplers).

(1) *Single Sampler Accuracy*. For the flow rate audit described in section 3.4.1, the percentage difference (d_i) for each audit is calculated using equation 1, where X_i represents the known flow rate and Y_i represents the flow rate indicated by the sampler.

(b) *Accuracy for Reporting Organization*. For each type of particulate matter measured (e.g., TSP/Pb), the average (D) of the individual percent differences for all similar particulate matter samplers audited during the calendar quarter is calculated using equation 8. The standard deviation (S_a) of the percentage differences for all of the similar particulate matter samplers audited during the calendar quarter is calulated using equation 9. The 95 percent probability limits for the integrated accuracy for the reporting organization are calculated using equations 6 and 7. For reporting organizations having four or fewer particulate matter samplers of one type, only one audit is required each quarter, and the audit results of two consecutive quarters are required to calculate an average and a standard deviation. In that case, probability limits shall be reported semi-annually rather than quarterly.

5.4.2 Analytical Methods for SO_2, NO_2, and Pb.

(a) *Single Analysis-Day Accuracy*. For each of the audits of the analytical methods for SO_2, NO_2, and Pb described in section 3.4.2, 3.4.3, and 3.4.4, the percentage difference (d_j) at each concentration level is calculated using equation 1, where X_j represents the known value of the audit sample and Y_j represents the value of SO, NO_2, and Pb indicated by the analytical method.

(b) *Accuracy for Reporting Organization*. For each analytical method, the average (D) of the individual percent differences at each concentration level for all audits during the calendar quarter is calculated using equation 8. The standard deviation (S_a) of the percentage differences at each concentration level for all audits during the calendar quarter is calculated using equation 9. The 95 percent probability limits for the accuracy for the reporting organization are calculated using equations 6 and 7.

References

1. Rhodes, R.C. Guideline on the Meaning and Use of Precision and Accuracy Data Required by 40 CFR part 58 appendices A and B. EPA–600/4–83/023. U.S. Environmental Protection Agency, Research Triangle Park, NC 27711, June, 1983.

2.''Quality Assurance Handbook for Air Pollution Measurement Systems, Volume 1—Principles.'' EPA–600/9–76–005. March 1976. Available from U.S. Environmental Protection Agency, Atmospheric Research and Exposure Assessment Laboratory (MD–77), Research Triangle Park, NC 27711.

3. ''Quality Assurance Handbook for Air Pollution Measurement Systems, Volume II—Ambient Air Specific Methods.'' EPA–600/4–77–027a. May 1977. Available from U.S. Environmental Protection Agency, Atmospheric Research and Exposure Assessment Laboratory (MD–77), Research Triangle Park, NC 27711.

4. ''List of Designated Reference and Equivalent Methods.'' Available from U.S. Environmental Protection Agency, Department E (MD–77), Research Triangle Park, NC 27711.

5. 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.

6. Hughes, E.E. and J. Mandel. A Procedure for Establishing Traceability of Gas Mixtures to Certain National Bureau of Standards SRM's. EPA–600/7–81–010. U.S. Environmental Protection Agency, Research Triangle Park, NC 27711, May, 1981. (Joint NBS/EPA Publication)

7. 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.

8. McElroy, F.F. Transfer Standards for the Calibration of Ambient Air Monitoring Analyzers for Ozone. EPA–600/4–79–056. U.S. Environmental Protection Agency, Research Triangle Park, NC 27711, September, 1979.

TABLE A–1—MINIMUM DATA ASSESSMENT REQUIREMENTS

Method	Assessment method	Coverage	Minimum frequency	Parameters reported
Precision:				
Automated methods for SO_2, NO_2, O_3, and CO.	Response checks at concentration between .08 & .10 ppm (8 & 10 ppm for CO)[2].	Each analyzer	Once per 2 weeks	Actual concentration[2] & measured concentration.[3]
Manual methods including lead.	Collocated samplers	1 site for 1–5 sites; 2 sites for 6–20 sites; 3 sites> 20 sites (sites with highest conc.).	Once per week	Two concentration measurements.
Accuracy:				
Automated methods for SO_2, NO_2, O_3, and CO.	Response checks at: .03–.08 ppm;[1,2] .15–.20 ppm;[1,2] .35–.45 ppm;[1,2] .80–.90 ppm;[1,2] (If applicable).	1. Each analyzer. 2. 25% of analyzers (at least 1).	1. Once per year. ..... 2. Each calendar quarter.	Actual concentration[2] & measured (indicated) concentration[3] for each level.
Manual methods for SO_2 and NO_2.	Check of analytical procedure with audit standard solutions.	Analytical system	Each day samples are analyzed, at least twice per quarter.	Actual concentration & measured (indicated) concentration for each audit solution.
TSP, PM–10	Check of sampler flow rate.	1. Each sampler. ..... 2. 25% of samplers (at least 1).	1. Once per year. ..... 2. Each calendar quarter.	Actual flow rate and flow rate indicated by the sampler.
Lead	1. Check sample flow rate as for TSP. 2. Check analytical system with Pb audit strips.	1. Each sampler. ..... 2. Analytical system	1. Include with TSP. .... 2. Each quarter	1. Same as for TSP. 2. Actual concentration & measured (indicated) concentration of audit samples (mu;g Pb/strip).

[1] Concentration times 100 for CO.
[2] Effective concentration for open path analyzers.
[3] Corrected concentration, if applicable, for open path analyzers.

[51 FR 9587, Mar. 19, 1986, as amended at 52 FR 24741, July 1, 1987; 58 FR 8468, Feb. 12, 1993; 59 FR 41628, 41629, Aug. 12, 1994; 60 FR 52320, Oct. 6, 1995]

APPENDIX B TO PART 58—QUALITY ASSURANCE REQUIREMENTS FOR PREVENTION OF SIGNIFICANT DETERIORATION (PSD) AIR MONITORING

1. *General Information*

This appendix specifies the minimum quality assurance requirements for the control and assessment of the quality of the PSD ambient air monitoring data submitted to EPA by an organization operating a network of PSD stations. Such organizations are encouraged to develop and maintain quality assurance programs more extensive than the required minimum.

Quality assurance of air monitoring systems includes two distinct and important interrelated functions. One function is the control of the measurement process through the implementation of policies, procedures, and corrective actions. The other function is the assessment of the quality of the monitoring data (the product of the measurement process). In general, the greater the effort and effectiveness of the control of a given monitoring system, the better will be the resulting quality of the monitoring data. The results of data quality assessments indicate whether the control efforts need to be increased.

Documentation of the quality assessments of the monitoring data is important to data users, who can then consider the impact of the data quality in specific applications (see Reference 1). Accordingly, assessments of PSD monitoring data quality are required to be made and reported periodically by the monitoring organization.

To provide national uniformity in the assessment and reporting of data quality among all PSD networks, specific assessment and reporting procedures are prescribed in detail in sections 3, 4, 5, and 6 of this appendix.

In contrast, the control function encompasses a variety of policies, procedures, specifications, standards, and corrective measures which affect the quality of the resulting data. The selection and extent of the quality control activities—as well as additional quality assessment activities—used by a monitoring organization depend on a number of local factors such as the field and laboratory conditions, the objectives of the monitoring, the level of the data quality needed, the expertise of assigned personnel, the cost of control procedures, pollutant concentration levels, etc. Therefore, the quality assurance requirements, in section 2 of this appendix, are specified in general terms to allow each organization to develop a quality control system that is most efficient and effective for its own circumstances.

For purposes of this appendix, ''organization'' is defined as a source owner/operator, a government agency, or their contractor that operates an ambient air pollution monitoring network for PSD purposes.

2. *Quality Assurance Requirements*

2.1 Each organization must develop and implement a quality assurance program consisting of policies, procedures, specifications, standards and documentation necessary to:

(1) Provide data of adequate quality to meet monitoring objectives and quality assurance requirements of the permit-granting authority, and

(2) Minimize loss of air quality data due to malfunctions or out-of-control conditions.

This quality assurance program must be described in detail, suitably documented, and approved by the permit-granting authority. The Quality Assurance Program will be reviewed during the system audits described in section 2.4.

2.2 Primary guidance for developing the Quality Assurance Program is contained in References 2 and 3, which also contain many suggested procedures, checks, and control specifications. Section 2.0.9 of Reference 3 describes specific guidance for the development of a Quality Assurance Program for automated analyzers. Many specific quality control checks and specifications for manual 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 (see Reference 4). Similarly, quality control procedures related to specifically designated reference and equivalent analyzers are contained in their respective operation and instruction manuals. This guidance, and any other pertinent information from appropriate sources, should be used by the organization in developing its quality assurance program.

As a minimum, each quality assurance program must include operational procedures for each of the following activities:

(1) Selection of methods, analyzers, or samplers;

(2) Training;

(3) Installation of equipment;

(4) Selection and control of calibration standards;

(5) Calibration;

(6) Zero/span checks and adjustments of automated analyzers;

(7) Control checks and their frequency;

(8) Control limits for zero, span and other control checks, and respective corrective actions when such limits are surpassed;

(9) Calibration and zero/span checks for multiple range analyzers (see section 2.6 of appendix C of this part);

(10) Preventive and remedial maintenance;

(11) Recording and validating data;

(12) Date quality assessment (precision and accuracy);

(13) Documentation of quality control information.

2.3 Pollutant Standards.

2.3.1 Gaseous standards (permeation tubes, permeation devices or cylinders of compressed gas) used to obtain test concentrations for CO, SO_2, and NO_2 must be traceable to either a National Institute of Standards and Technology (NIST) gaseous Standard Reference Material (SRM) or an NIST/EPA-approved commercially available Certified Reference Material (CRM). CRM's are described in Reference 5, and a list of CRM sources is available from Quality Assurance Division (MD–77), Atmospheric Research and Exposure Assessment Laboratory, U.S. Environmental Protection Agency, Research Triangle Park, NC 27711. A recommended protocol for certifying gaseous standards against an SRM or CRM is given in section 2.0.7 of Reference 3. Direct use of a CRM as a working standard is acceptable, but direct use of an NIST SRM as a working standard is discouraged because of the limited supply and expense of SRM's.

2.3.2 Test concentrations for ozone must be obtained in accordance with the UV photometric calibration procedure specified in appendix D of part 50 of this chapter, or by means of a certified ozone transfer standard. Consult References 6 and 7 for guidance on primary and transfer standards for ozone.

2.3.3. Flow measurement must be made by a flow measuring instrument that is traceable to an authoritative volume or other standard. Guidance for certifying various types of flowmeters is provided in Reference 3.

2.4 Performance and System Audit Programs. The organization operating a PSD monitoring network must participate in

EPA's national performance audit program. The permit granting authority, or EPA, may conduct system audits of the ambient air monitoring programs of organizations operating PSD networks. See section 1.4.16 of reference 2 and section 2.0.11 of reference 3 for additional information about these programs. Organizations should contact either the appropriate EPA Regional Quality Control Coordinator or the Quality Assurance Branch, AREAL/RTP, at the address given in reference 3 for instructions for participation.

3. *Data Quality Assessment Requirements*

All ambient monitoring methods or analyzers used in PSD monitoring shall be tested periodically, as described in this section 3, to quantitatively assess the quality of the data being routinely collected. The results of these tests shall be reported as specified in section 6. Concentration standards used for the tests must be as specified in section 2.3. Additional information and guidance in the technical aspects of conducting these tests may be found in Reference 3 or in the operation or instruction manual associated with the analyzer or sampler. Concentration measurements reported from analyzers or analytical systems must be derived by means of the same calibration curve and data processing system used to obtain the routine air monitoring data. Table B–1 provides a summary of the minimum data quality assessment requirements, which are described in more detail in the following sections.

3.1 Precision of Automated Methods. A one-point precision check must be carried out at least once every two weeks on each automated analyzer used to measure SO_2, NO_2, O_2, and CO. The precision check is made by challenging the analyzer with a precision check gas of known concentration (effective concentration for open path analyzers) between 0.08 and 0.10 ppm for SO_2, NO_2, and O_3 analyzers, and between 8 and 10 ppm for CO analyzers. The standards from which precision check test concentrations are obtained must meet the specifications of section 2.3. Except for certain CO analyzers described below, point analyzers must operate in their normal sampling mode during the precision 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 precision 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.

Open path analyzers are tested by inserting a test cell containing a precision 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 precision check gas in the test cell must be selected to produce an ''effective concentration'' in the range specified above. Generally, the precision test concentration measurement will be the sum of the atmospheric pollutant concentration and the precision 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 precision check test from the precision test 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.

If a precision check is made in conjunction with a zero or span adjustment, it must be made prior to such zero or span adjustment. The difference between the actual concentration (effective concentration for open path analyzers) of the precision check gas and the corresponding concentration measurement (corrected concentration, if applicable, for open path analyzers) indicated by the analyzer is used to assess the precision of the monitoring data as described in section 4.1. Report data only from automated analyzers that are approved for use in the PSD network.

3.2 Accuracy of Automated Methods. Each sampling quarter, audit each analyzer that monitors for SO_2, NO_2, O_3, or CO at least once. The audit is made by challenging the analyzer with at least one audit gas of known concentration (effective concentration for open path analyzers) from each of the following ranges that fall within the measurement range of the analyzer being audited:

Audit level	Concentration range, ppm		CO
	SO_2, O_3,	NO_2,	
1	0.03–0.08	0.03–0.08	3–8
2	0.15–0.20	0.15–0.20	15–20

Audit level	Concentration range, ppm		CO
	SO_2, O_3,	NO_2,	
3	0.36–0.45	0.35–0.45	35–45
4	0.80–0.90	.....	80–90

NO_2 audit gas for chemiluminescence-type NO_2 analyzers must also contain at least 0.08 ppm NO.

NOTE: NO concentrations substantially higher than 0.08 ppm, as may occur when using some gas phase titration (GPT) techniques, may lead to audit 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. 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.

The standards from which audit gas test concentrations are obtained must meet the specifications of section 2.3. Working and transfer standards and equipment used for auditing must be different from the standards and equipment used for calibration and spanning. The auditing standards and calibration standards may be referenced to the same NIST, SRM, CRM, or primary UV photometer. The auditor must not be the operator/analyst who conducts the routine monitoring, calibration and analysis.

For point analyzers, the audit shall be carried out by allowing the analyzer to analyze the audit test atmosphere in the same manner as described for precision checks in section 3.1. The exception given in section 3.1 for certain CO analyzers does not apply for audits.

Open path analyzers are audited by inserting a test cell containing an audit 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 audit, and the normal monitoring configuration of the instrument should be modified as little as possible to accommodate the test cell for the audit. 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 range specified in this section 3.2. Generally, each audit concentration measurement result will be the sum of the atmospheric pollutant concentration and the audit 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 audit test (or preferably before and after each audit concentration level) from the audit concentration measurement. If the difference between these before and after measurements is greater than 20 percent of the effective concentration of the test gas standards, discard the test result for that concentration level and repeat the test for that level. If possible, open path analyzers should be audited during periods when the atmospheric pollutant concentrations are relatively low and steady. Also, the monitoring path length must be reverified to within ±3 percent to validate the audit, since the monitoring path length is critical to the determination of the effective concentration.

The differences between the actual concentrations (effective concentrations for open path analyzers) of the audit test gas and the corresponding concentration measurements (corrected concentrations, if applicable, for open path analyzers) indicated by the analyzer are used to assess the accuracy of the monitoring data as described in section 4.2. Report data only from automated analyzers that are approved for use in the PSD network.

3.3 Precision of Manual Methods.

3.3.1 TSP and PM_{10} Methods. For a given organization's monitoring network, one sampling site must have collocated samplers. A site with the highest expected 24-hour pollutant concentration must be selected. The two samplers must be within 4 meters of each other but at least 2 meters apart to preclude airflow interference. Calibration, sampling and analysis must be the same for both collocated samplers as well as for all other samplers in the network. The collocated samplers must be operated as a minimum every third day when continuous sampling is used. When a less frequent sample schedule is used, the collocated samplers must be operated at least once each week. For each pair of collocated samplers, designate one sampler as the sampler which will be used to report air quality for the site and designate the other as the duplicate sampler. The differences in measured concentration ($\mu g/m^3$) between the two collocated samplers are used to calculate precision as described in section 5.1.

3.3.2 Pb Method. The operation of collocated samplers at one sampling site must be used to assess the precision of the reference or an equivalent Pb method. The procedure to be followed for Pb methods is the same as described in 3.3.1 for the TSP method. If approved by the permit granting authority, the collocated TSP samplers may serve as the collocated lead samplers.

3.4 Accuracy of Manual Methods.

3.4.1 TSP and PM_{10} Methods. Each sampling quarter, audit the flow rate of each sampler at least once. Audit the flow at the normal flow rate, using a certified flow transfer standard (see reference 2). The flow transfer standard used for the audit must not be the same one used to calibrate the flow of the sampler being audited, although both transfer standards may be referenced to the same primary flow or volume standard. The difference between the audit flow measurement and the flow indicated by the sampler's flow indicator is used to calculate accuracy, as described in paragraph 5.2.

Great care must be used in auditing high-volume samplers having flow regulators because the introduction of resistance plates in the audit device can cause abnormal flow patterns at the point of flow sensing. For this reason, the orifice of the flow audit device should be used with a normal glass fiber 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.

3.4.2 Pb Method. For the reference method (appendix G of part 50 of this chapter) during each sampling quarter audit the flow rate of each high-volume Pb sampler at least once. The procedure to be followed for lead methods is the same as described in section 3.4.1 for the TSP method.

For each sampling quarter, audit the Pb analysis using glass fiber filter strips containing a known quantity of lead. Audit samples are prepared by depositing a Pb solution on 1.9 cm by 20.3 cm (¾ inch by 8 inch) unexposed glass fiber filter strips and allowing to dry thoroughly. The audit samples must be prepared using reagents different from those used to calibrate the Pb analytical equipment being audited. Prepare audit samples in the following concentration ranges:

Ranges	Pb concentration μ g/strip	Equivalent ambient Pb concentration[1] μ g/m³
1	100 to 300	0.5 to 1.5.
2	600 to 1,000	3.0 to 5.0.

[1] Equivalent ambient Pb concentration in μ g/m³ is based on sampling at 1.7 m³/min for 24 hours on 20.3 cm x 25.4 cm (8 inch x 10 inch) glass fiber filter.

Audit samples must be extracted using the same extraction procedure used for exposed filters.

Analyze at least one audit sample in each of the two ranges each day that samples are anlayzed. The difference between the audit concentration (in mu;g Pb/strip) and the analyst's measured concentration (in mu;g Pb/strip is used to calculate accuracy as described in section 5.4.

The accuracy of an equivalent method is assessed in the same manner as the reference method. The flow auditing device and Pb analysis audit samples must be compatible with the specific requirements of the equivalent method.

4. *Calculations for Automated Methods*

4.1 Single Analyzer Precision. Each organization, at the end of each sampling quarter, shall calculate and report a precision probability interval for each analyzer. Directions for calculations are given below and directions for reporting are given in section 6. If monitoring data are invalidated during the period represented by a given precision check, the results of that precision check shall be excluded from the calculations. Calculate the percentage difference (d_i) for each precision check using equation 1.

$$d_i = \frac{Y_1 - X_1}{X_1} \times 100 \qquad (1)$$

where:

Y_i=analyzer's indicated concentration from the i-th precision check

X_i=known concentration of the test gas used for the i-th precision check.

For each instrument, calculate the quarterly average (d_j), equation 2, and the standard deviation (S_j), equation 3.

$$d_j = \frac{1}{n}\sum_{i=1}^{n} d_i \qquad (2)$$

$$S_j = \sqrt{\frac{1}{n-1}\left[\sum_{i=1}^{n} d^2{}_i - \frac{1}{n}\left(\sum_{i=1}^{n} d_i\right)^2\right]} \qquad (3)$$

where n is the number of precision checks on the instrument made during ther sampling quarter. For example, n should be 6 or 7 if span checks are made biweekly during a quarter.

Calculate the 95 percent probability limits for precision using equation 4 and 5.

Upper 95 Percent Probability Limit = $d_j + 1.96\ S_j$ (4)

Lower 95 Percent Probability Limit = $d_j - 1.96\ S_j$ (5)

4.2 Single Analyzer Accuracy. Each organization, at the end of each sampling quarter, shall calculate and report the percentage difference for each audit concentration for each analyzer audited during the quarter. Directions for calculations are given below (directions for reporting are given in section 6).

Calculate and report the percentage difference (d_i) for each audit concentration using equation 1 where Y_i is the analyzer's indicated concentration from the i-th audit check and X_i is the known concentration of the audit gas used for the i-th audit check.

5. *Calculations for Manual Methods*

5.1 Single Instrument Precision for TSP, Pb and PM_{10}. Estimates of precision for ambient air quality particulate measurements are calculated from results obtained from collocated samplers as described in section 3.3. At the end of each sampling quarter, calculate and report a precision probability interval, using weekly result from the collecated samplers. Directions for calculations are given below, and directions for reporting are given in section 6.

For the paired measurements obtained as described in sections 3.3.1 and 3.3.2, calculate the percent difference (d_i) using equation 1a, where Y_i is the concentration of pollutant measured by the duplicate sampler, and X_i is the concentration measured by the sampler reporting air quality for the site. Calculate the quarterly average percent difference (d_j), equation 2; standard deviation (S_j), equation 3; and upper and lower 95 percent probability limits for precision, equations 6 and 7.

$$d_i = \frac{Y_i - X_i}{\left(Y_i + X_i\right)\ 2} \times 100 \qquad (1a)$$

$$\text{Upper 95 percent probability limit} = d_j + 1.96\ S_j/\sqrt{2} \qquad (6)$$

$$\text{Lower 95 percent probability limit} = d_j - 1.96\ S_j/\sqrt{2} \qquad (7)$$

5.2 Single Instrument Accuracy for TSP and PM_{10}. Each organization, at the end of each sampling quarter, shall calculate and report the percentage difference for each high-volume or PM_{10} sampler audited during the quarter. Directions for calculation are given below and directions for reporting are given in section 6.

For the flow rate audit described in section 3.4, let X_i represent the known flow rate and Y_i represent the indicated flow rate. Calculate the percentage difference (d_i) using equation 1.

5.3 Single Instrument Accuracy for Pb. Each organization, at the end of each sampling quarter, shall calculate and report the percentage difference for each high-volume lead sampler audited during the quarter. Directions for calculation are given in 5.2 and directions for reporting are given in section 6.

5.4 Single-Analysis-Day Accuracy for Pb. Each organization, at the end of each sampling quarter, shall calculate and report the percentage difference for each Pb analysis audit during the quarter. Directions for calculations are given below and directions for reporting are given in section 6.

For each analysis audit for Pb described in section 3.4.2, let X_i represent the known value of the audit sample and Y_i the indicated value of Pb. Calculate the percentage difference (d_i) for each audit at each concentration level using equation 1.

6. *Organization Reporting Requirements.*

At the end of each sampling quarter, the organization must report the following data assessment information:

(1) For automated analyzers—precision probability limits from section 4.1 and percentage differences from section 4.2, and

(2) For manual methods—precision probability limits from section 5.1 and percentage differences from sections 5.2 and 5.3. The precision and accuracy information for the entire sampling quarter must be submitted with the air monitoring data. All data used to calculate reported estimates of precision and accuracy including span checks, collocated sampler and audit results must be made available to the permit granting authority upon request.

TABLE B–1—MINIMUM PSD DATA ASSESSMENT REQUIREMENTS

Method	Assessment method	Coverage	Frequency	Parameters reported
Precision:				
Automated Methods for SO_2, NO_2, O_3, and CO.	Response check at concentration between .08 & .10 ppm (8 & 10 ppm for CO)[2].	Each analyzer	Once per 2 weeks	Actual concentration[2] & measured concentration.[3]
TSP, PM_{10}, Lead	Collocated samplers	Highest concentration site in monitoring network.	Once per week or every 3rd day for continuous sampling.	Two concentration measurements.
Accuracy:				
Automated Methods for SO_2, NO_2, O_3, and CO.	Response check at: .03–.08 ppm;[1,2] .15–.20 ppm;[1,2] .35–.45 ppm;[1,2] .80–.90 ppm;[1,2] (if applicable).	Each analyzer	Once per sampling quarter.	Actual concentration[2] & measured (indicated) concentration[3] for each level.
TSP, PM_{10}	Sampler flow check	Each sampler	Once per sampling quarter.	Actual flow rate and flow rate indicated by the sampler.

TABLE B–1—MINIMUM PSD DATA ASSESSMENT REQUIREMENTS—Continued

Method	Assessment method	Coverage	Frequency	Parameters reported
Lead	1. Sample flow rate check.. 2. Check analytical system with Pb audit strips.	1. Each sampler. ..... 2. Analytical system	1. Once/quarter. ..... 2. Each quarter Pb samples are analyzed.	1. Same as for TSP. 2. Actual concentration & measured concentration of audit samples (μ g Pb/strip).

[1] Concentration shown times 100 for CO.
[2] Effective concentration for open path analyzers.
[3] Corrected concentration, if applicable, for open path analyzers.

References

1. Rhodes, R.C. Guideline on the Meaning and Use of Precision and Accuracy Data Required by 40 CFR part 58, appendices A and B. EPA–600/4–83–023. U.S. Environmental Protection Agency, Research Triangle Park, NC 27711, June, 1983.

2. ''Quality Assurance Handbook for Air Pollution Measurement Systems, Volume I—Principles.'' EPA–600/9–76–005. March 1976. Available from U.S Environmental Protection Agency, Atmospheric Research and Exposure Assessment Laboratory (MD–77), Research Triangle Park, NC 27711.

3. ''Quality Assurance Handbook for Air Pollution Measurement Systems, Volume II—Ambient Air Specific Methods.'' EPA–600/4–77–027a. May 1979. Available from U.S. Environmental Protection Agency, Atmospheric Research and Exposure Assessment Laboratory(MD–77), Research Triangle Park, NC 27711.

4. ''List of Designated Reference and Equivalent Methods.'' Available from U.S. Environmental Protection Agency, Department E (MD–77), Research Triangle Park, NC 27711.

5. Hughes, E.E. and J. Mandel. A Procedure for Establishing Traceability of Gas Mixtures to Certain National Bureau of Standards SRM's. EPA–600/7–81–010. U.S. Environmental Protection Agency, Research Triangle Park, NC 27711, May, 1981. (Joint NBS/EPA Publication)

6. 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, Atmospheric Research and Exposure Assessment Laboratory (MD–77), Research Triangle Park, NC 27711, September, 1979.

7. McElroy, F.F. Transfer Standards for the Calibration of Ambient Air Monitoring Analyzers for Ozone. EPA–600/4–79–056. U.S. Environmental Protection Agency, Atmospheric Research and Exposure Assessment Laboratory (MD–77), Research Triangle Park, NC 27711, September, 1979.

[44 FR 27571, May 10, 1979; 44 FR 65070, Nov. 9, 1979; 44 FR 72592, Dec. 14, 1979, as amended at 46 FR 44168, Sept. 3, 1981; 48 FR 2530, Jan. 20, 1983; 51 FR 9596, Mar. 19, 1986; 52 FR 24741, July 1, 1987; 59 FR 41628, 41629, Aug. 12, 1994; 60 FR 52321, Oct. 6, 1995]

APPENDIX C TO PART 58—AMBIENT AIR QUALITY MONITORING METHODOLOGY

1.0 *Purpose*

This appendix specifies the monitoring methods (manual methods or automated analyzers) which must be used in State ambient air quality monitoring stations.

2.0 *State and Local Air Monitoring Stations (SLAMS)*

2.1 Except as otherwise provided in this appendix, a monitoring method used in a SLAMS must be a reference or equivalent method as defined in §50.1 of this chapter.

2.2 For purposes of showing compliance with the NAAQS for particulate matter, the high volume sampler described in appendix B of part 50 of this chapter may be used in a SLAMS as long as the ambient concentration of particles measured by the high volume sampler is below the PM_{10} NAAQS.

If the TSP sampler measures a single value which is higher than the PM_{10} 24-hour standard or has an annual average greater than the PM_{10} annual standard, the high volume sampler designated as a substitute PM_{10} sampler must be replaced with a PM_{10} sampler. For the 24-hour standard, the TSP sampler should be replaced with a PM_{10} sampler before the end of the calendar quarter following the quarter in which the exceedance occurred. For the annual standard, the PM_{10} sampler should be operating by June 30 of the year following the exceedance.

In order to maintain historical continuity of ambient particulate matter trends and patterns, for PM_{10} NAMS that were previously TSP NAMS, the TSP high volume sampler must be concurrently operated with

the PM_{10} sampler for a one-year period beginning with the PM_{10} NAMS start up date. The operating schedule for the TSP sampler must be at least once every six days regardless of the PM_{10} sampling frequency.

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 in a SLAMS following cancellation for a reasonable period of time to be determined by the Administrator.

2.4–2.5 [Reserved]

2.6 Use of Methods With Higher, Nonconforming Ranges in Certain Geographical Areas.

2.6.1 [Reserved]

2.6.2 Nonconforming Ranges. 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 must meet the submittal requirements of section 2.7. Except as provided in subsection 2.7.3, each request must contain the information specified in subsection 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 subsection 2.7.2.2 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.

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, 2.5, or 2.6.2 must be submitted to: Director, Atmospheric Research and Exposure Assessment Laboratory, Department E (MD 75), United States Environmental Protection Agency, Environmental Research Center, Research Triangle Park, North Carolina 27711.

2.7.2 Except as provided in section 2.7.3, 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, 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 information available to him, that any of the determinations or statements on which approval of a request under this section (2.7) 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 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 (2.8), no reference method, equivalent method, or alternative method may be used in a SLAMS if it has been modified in a manner that will, or might, significantly alter the performance characteristics of the method without prior approval by the Administrator. For purposes of this section (2.8), ''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 Within 75 days after receiving a request for approval under this section (2.8) and such further information as he may request for purposes of his decision, the Administrator will approve or disapprove the modification in question by letter to the person or agency requesting such approval.

2.8.5 A temporary modification that will or might alter the performance characteristics of a reference, equivalent, or alternative method may be made without prior approval under this section (2.8) 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, 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 §58.28 or §58.35 of this chapter and must be accompanied by a report containing the information specified in section 2.8.3. A request that the Administrator approve a temporary modification may be submitted in accordance with sections 2.8.1 through 2.8.4. In such cases the request will be considered as if a request for prior approval had been made.

3.0 *National Air Monitoring Stations (NAMS)*

3.1 Methods used in those SLAMS which are also designated as NAMS to measure SO_2, CO, NO_2, or O_3 must be automated reference or equivalent methods (continuous analyzers).

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 §58.40 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. 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 §58.40 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 Quality Assurance. PM_{10} methods other than the reference method are not covered under the quality assessment requirements

of appendix A. 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 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.

[44 FR 27571, May 10, 1979, as amended at 44 FR 37918, June 29, 1979; 44 FR 65070, Nov. 9, 1979; 51 FR 9597, Mar. 19, 1986; 52 FR 24741, 24742, July 1, 1987; 58 FR 8469, Feb. 12, 1993; 59 FR 41628, Aug. 12, 1994]

APPENDIX D TO PART 58—NETWORK DESIGN FOR STATE AND LOCAL AIR MONITORING STATIONS (SLAMS), NATIONAL AIR MONITORING STATIONS (NAMS), AND PHOTOCHEMICAL ASSESSMENT MONITORING STATIONS (PAMS)

1. SLAMS Monitoring Objectives and Spatial Scales
2. SLAMS Network Design Procedures
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3.1 [Reserved]
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4. Summary
5. References

1. *SLAMS Monitoring Objectives and Spatial Scales*

The purpose of this appendix is to describe monitoring objectives and general criteria to be applied in establishing the State and Local Air Monitoring Stations (SLAMS) networks and for choosing general locations for new monitoring stations. It also describes criteria for determining the number and location of National Air Monitoring Stations (NAMS) and Photochemical Assessment Monitoring Stations (PAMS). These criteria will also be used by EPA in evaluating the adequacy of the SLAMS/NAMS/PAMS networks.

The network of stations which comprise SLAMS should be designed to meet a minimum of four basic monitoring objectives. These basic monitoring objectives are: (1) To determine highest concentrations expected to occur in the area covered by the network; (2) to determine representative concentrations in areas of high population density; (3) to determine the impact on ambient pollution levels of significant sources or source categories; and (4) to determine general background concentration levels. Of these four basic ambient air monitoring network design objectives, attempts to measure in areas of maximum concentrations and maximum population exposures (these can be exclusive or coincident) are primary due to the combination of prevailing needs and constraints.

It should be noted that this appendix contains no criteria for determining the total number of stations in SLAMS networks, except that a minimum number of lead SLAMS is prescribed. The optimum size of a particular SLAMS network involves tradeoffs between data needs and available resources which the EPA believes can best be resolved during the network design process.

This appendix focuses on the relationship between monitoring objectives and the geographical location of monitoring stations. Included are a rationale and set of general criteria for identifying candidate station locations in terms of physical characteristics which most closely match a specific monitoring objective. The criteria for more specifically siting the monitoring station, including spacing from roadways and vertical and horizontal probe and path placement, are described in appendix E of this part.

To clarify the nature of the link between general monitoring objectives and the physical location of a particular monitoring station, the concept of spatial scale of representativeness of a monitoring station is defined. The goal in siting stations is to correctly match the spatial scale represented by the sample of monitored air with the spatial scale most appropriate for the monitoring objective of the station.

Thus, spatial scale of representativeness is described in terms of the physical dimensions of the air parcel nearest to a monitoring station throughout which actual pollutant concentrations are reasonably similar. The scale of representativeness of most interest for the monitoring objectives defined above are as follows:

Microscale—defines the concentrations in air volumes associated with area dimensions ranging from several meters up to about 100 meters.

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.

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.

Urban Scale—defines the overall, citywide conditions with dimensions on the order of 4 to 50 kilometers. This scale would usually require more than one site for definition.

Regional Scale—defines usually a rural area of reasonably homogeneous geography and extends from tens to hundreds of kilometers.

National and Global Scales—these measurement scales represent concentrations characterizing the nation and the globe as a whole.

Proper siting of a monitoring station requires precise specification of the monitoring objective which usually includes a desired spatial scale of representativeness. For example, consider the case where the objective is to determine maximum CO concentrations in areas where pedestrians may reasonably be exposed. Such areas would most likely be located within major street canyons of large urban areas and near traffic corridors. Stations located in these areas are most likely to have a microscale of representativeness since CO concentrations typically peak nearest roadways and decrease rapidly as the monitor is moved from the roadway. In this example, physical location was determined by consideration of CO emission patterns, pedestrian activity, and physical characteristics affecting pollutant dispersion. Thus, spatial scale of representativeness was not used in the selection process but was a *result* of station location.

In some cases, the physical location of a station is determined from joint consideration of both the basic monitoring objective, and a desired spatial scale of representativeness. For example, to determine CO concentrations which are typical over a reasonably broad geographic area having relatively high CO concentrations, a neighborhood scale station is more appropriate. Such a station would likely be located in a residential or commercial area having a high overall CO emission density but not in the immediate vicinity of any single roadway. Note that in this example, the desired scale of representativeness was an important factor in determining the physical location of the monitoring station.

In either case, classification of the station by its intended objective and spatial scale of representativeness is necessary and will aid in interpretation of the monitoring data.

Table 1 illustrates the relationship between the four basic monitoring objectives and the scales of representativeness that are generally most appropriate for that objective.

TABLE 1—RELATIONSHIP AMONG MONITORING OBJECTIVES AND SCALE OF REPRESENTATIVENESS

Monitoring objective	Appropriate siting scales
Highest concentration ...	Micro, middle, neighborhood (some-times urban).
Population	Neighborhood, urban.
Source impact	Micro, middle, neighborhood.
General/background	Neighborhood, regional.

Open path analyzers can often be used effectively and advantageously to provide better monitoring representation for population exposure monitoring and general or background monitoring in urban and neighborhood scales of representation. Such analyzers may also be able to provide better area coverage or operational advantages in high concentration and source-impact monitoring in middle scale and possibly microscale areas. However, siting of open path analyzers for the latter applications must be carried out with proper regard for the specific monitoring objectives and for the path-averaging nature of these analyzers. Monitoring path lengths need to be commensurate with the intended scale of representativeness and located carefully with respect to local sources or potential obstructions. For short-term/high-concentration or source-oriented monitoring, the monitoring path may need to be further restricted in length and be oriented approximately radially with respect to the source in the downwind direction, to provide adequate peak concentration sensitivity. Alternatively, multiple (e.g., orthogonal) paths may be used advantageously to obtain both wider area coverage and peak concentration sensitivity. Further discussion on this topic is included in section 2.2 of this appendix.

Subsequent sections of this appendix describe in greater detail the most appropriate

scales of representativeness and general monitoring locations for each pollutant.

2. *SLAMS Network Design Procedures*

The preceding section of this appendix has stressed the importance of defining the objectives for monitoring a particular pollutant. Since monitoring data are collected to ''represent'' the conditions in a section or subregion of a geographical area, the previous section included a discussion of the scale of representativeness of a monitoring station. The use of this physical basis for locating stations allows for an objective approach to network design.

The discussion of scales in sections 2.2–2.6 does not include all of the possible scales for each pollutant. The scales which are discussed are those which are felt to be most pertinent for SLAMS network design.

In order to evaluate a monitoring network and to determine the adequacy of particular monitoring stations, it is necessary to examine each pollutant monitoring station individually by stating its monitoring objective and determining its spatial scale of representativeness. This will do more than insure compatibility among stations of the same type. It will also provide a physical basis for the interpretation and application of the data. This will help to prevent mismatches between what the data actually represent and what the data are interpreted to represent. It is important to note that SLAMS are not necessarily sufficient for completely describing air quality. In many situations, diffusion models must be applied to complement ambient monitoring, e.g., determining the impact of point sources or defining boundaries of nonattainment areas.

2.1 Background Information for Establishing SLAMS. Background information that must be considered in the process of selecting SLAMS from the existing network and in establishing new SLAMS includes emission inventories, climatological summaries, and local geographical characteristics. Such information is to be used as a basis for the judgmental decisions that are required during the station selection process. For new stations, the background information should be used to decide on the actual location considering the monitoring objective and spatial scale while following the detailed procedures in References 1 through 4.

Emission inventories are generally the most important type of background information needed to design the SLAMS network. The emission data provide valuable information concerning the size and distribution of large point sources. Area source emissions are usually available for counties but should be subdivided into smaller areas or grids where possible, especially if diffusion modeling is to be used as a basis for determining where stations should be located. Sometimes this must be done rather crudely, for example, on the basis of population or housing units. In general, the grids should be smaller in areas of dense population than in less densely populated regions.

Emission inventory information for point sources should be generally available for any area of the country for annual and seasonal averaging times. Specific information characterizing the emissions from large point sources for the shorter averaging times (diurnal variations, load curves, etc.) can often be obtained from the source. Area source emission data by season, although not available from the EPA, can be generated by apportioning annual totals according to degree days.

Detailed area source data are also valuable in evaluating the adequacy of an existing station in terms of whether the station has been located in the desired spatial scale of representativeness. For example, it may be the desire of an agency to have an existing CO station measuring in the neighborhood scale.

By examining the traffic data for the area and examining the physical location of the station with respect to the roadways, a determination can be made as to whether or not the station is indeed measuring the air quality on the desired scale.

The climatological summaries of greatest use are the frequency distributions of wind speed and direction. The wind rose is an easily interpreted graphical presentation of the directional frequencies. Other types of useful climatological data are also available, but generally are not as directly applicable to the site selection process as are the wind statistics.

In many cases, the meteorological data originating from the most appropriate (not necessarily the nearest) national weather service (NWS) airport station in the vicinity of the prospective siting area will adequately reflect conditions over the area of interest, at least for annual and seasonal averaging times. In developing data in complex meteorological and terrain situations, diffusion meteorologists should be consulted. NWS stations can usually provide most of the relevant weather information in support of network design activities anywhere in the country. Such information includes joint frequency distributions of winds and atmospheric stability (stability-wind roses).

The geographical material is used to determine the distribution of natural features, such as forests, rivers, lakes, and manmade features. Useful sources of such information may include road and topographical maps, aerial photographs, and even satellite photographs. This information may include the terrain and land-use setting of the prospective monitor siting area, the proximity of larger water bodies, the distribution of pollutant sources in the area, the location of NWS airport stations from which weather

data may be obtained, etc. Land use and topographical characteristics of specific areas of interest can be determined from U.S. Geological Survey (USGS) maps and land use maps. Detailed information on urban physiography (building/street dimensions, etc.) can be obtained by visual observations, aerial photography, and also surveys to supplement the information available from those sources. Such information could be used in determining the location of local pollutant sources in and around the prospective station locations.

2.2 Substantive Changes in SLAMS/NAMS Network Design Elements. Two important purposes of the SLAMS monitoring data are to examine and evaluate overall air quality within a certain region, and to assess the trends in air pollutant levels over several years. The EPA believes that one of the primary tools for providing these characterizations is an ambient air monitoring program which implements technically representative networks. The design of these networks must be carefully evaluated not only at their outset, but at relatively frequent intervals thereafter, using an appropriate combination of other important technical tools, including: dispersion and receptor modeling, saturation studies, point and area source emissions analyses, and meteorological assessments. The impetus for these subsequent reexaminations of monitoring network adequacy stems not only from the need to evaluate the effect that changes in the environment may pose, but also from the recognition that new and/or refined tools and techniques for use in impact assessments are continually emerging and available for application.

Substantiative changes to an ambient air monitoring network are both inevitable and necessary; however, any changes in any substantive aspect of an existing SLAMS network or monitoring site that might affect the continuity or comparability of pollutant measurements over time must be carefully and thoroughly considered. Such substantive changes would include cessation of monitoring at an existing site, relocation of an existing site, a change in the type of monitoring method used, any change in the probe or path height or orientation that might affect pollutant measurements, any significant changes in calibration procedures or standards, any significant change in operational or quality assurance procedures, any significant change in the sources or the character of the area in the vicinity of a monitoring site, or any other change that could potentially affect the continuity or comparability of monitoring data obtained before and after the change.

In general, these types of changes should be made cautiously with due consideration given to the impact of such changes on the network/site's ability to meet its intended goals. Some of these changes will be inevitable (such as when a monitoring site will no longer be available and the monitor must be relocated, for example). Other changes may be deemed necessary and advantageous, after due consideration of their impact, even though they may have a deleterious effect on the long-term comparability of the monitoring data. In these cases, an effort should be made to quantify, if possible, or at least characterize, the nature or extent of the effects of the change on the monitoring data. In all cases, the changes and all information pertinent to the effect of the change should be properly and completely documented for evaluation by trends analysts.

The introduction of open path methods to the SLAMS monitoring network may seem relatively straightforward, given the kinds of technical analyses required in this appendix. However, given the uncertainties attendant to these analyses and the critical nature and far-reaching regulatory implications of some sites in the current SLAMS network composed of point monitors, there is a need to 'bridge' between databases generated by these different candidate methods to evaluate and promote continuity in understanding of the historical representativeness of the database.

Concurrent, nominally collocated monitoring must be conducted in all instances where an open path analyzer is effectively intended to replace a criteria pollutant point monitor which meets either of the following:

1. Data collected at the site represents the maximum concentration for a particular nonattainment area; or

2. Data collected at the site is currently used to characterize the development of a nonattainment area State implementation plan.

The Regional Administrator, the Administrator, or their appropriate designee may also require collocated monitoring at other sites which are, based on historical technical data, significant in assessing air quality in a particular area. The term of this requirement is determined by the Regional Administrator (for SLAMS), Administrator (for NAMS), or their appropriate designee. The recommended minimum term consists of one year (or one season of maximum pollutant concentration) with a maximum term indexed to the subject pollutant NAAQS compliance interval (e.g., three calendar years for ozone). The requirement involves concurrent monitoring with both the open path analyzer and the existing point monitor during this term. Concurrent monitoring with more than one point analyzer with an open path analyzer using one or more measurement paths may also be advantageous to confirm adequate peak concentration sensitivity or to optimize the location and length of the monitoring path or paths.

All or some portion of the above requirement may be waived by the Regional Administrator (for SLAMS), the Administrator (for NAMS), or their designee in response to a request, based on accompanying technical information and analyses, or in certain unavoidable instances caused by logistical circumstances.

These requirements for concurrent monitoring also generally apply to situations where the relocation of any SLAMS site, using either a point monitor or an open path analyzer, within an area is being contemplated.

2.3 Sulfur Dioxide (SO_2) Design Criteria for SLAMS. The spatial scales for SO_2 SLAMS monitoring are the middle, neighborhood, urban, and regional scales. Because of the nature of SO_2 distributions over urban areas, the middle scale is the most likely scale to be represented by a single measurement in an urban area, but only if the undue effects from local sources (minor or major point sources) can be eliminated. Neighborhood scales would be those most likely to be represented by single measurements in suburban areas where the concentration gradients are less steep. Urban scales would represent areas where the concentrations are uniform over a larger geographical area. Regional scale measurements would be associated with rural areas.

Middle Scale—Some data uses associated with middle scale measurements for SO_2 include assessing the effects of control strategies to reduce urban concentrations (especially for the 3-hour and 24-hour averaging times) and monitoring air pollution episodes.

Neighborhood Scale—This scale applies in areas where the SO_2 concentration gradient is relatively flat (mainly suburban areas surrounding the urban center) or in large sections of small cities and towns. In general, these areas are quite homogeneous in terms of SO_2 emission rates and population density. Thus, neighborhood scale measurements may be associated with baseline concentrations in areas of projected growth and in studies of population responses to exposure to SO_2. Also concentration maxima associated with air pollution episodes may be uniformly distributed over areas of neighborhood scale, and measurements taken within such an area would represent neighborhood, and to a limited extent, middle scale concentrations.

Urban Scale—Data from this scale could be used for the assessment of air quality trends and the effect of control strategies on urban scale air quality.

Regional Scale—These measurements would be applicable to large homogeneous areas, particularly those which are sparsely populated. Such measurements could provide information on background air quality and interregional pollutant transport.

After the spatial scale has been selected to meet the monitoring objectives for each station location, the procedures found in reference 2 should be used to evaluate the adequacy of each existing SO_2 station and must be used to relocate an existing station or to locate any new SLAMS stations. The background material for these procedures should consist of emission inventories, meteorological data, wind roses, and maps for population and topographical characteristics of specific areas of interest. Isopleth maps of SO_2 air quality as generated by diffusion models[5] are useful for the general determination of a prospective area within which the station is eventually placed.

2.4 Carbon Monoxide (CO) Design Criteria for SLAMS. Micro, middle, and neighborhood scale measurements are necessary station classifications for SLAMS since most people are exposed to CO concentrations in these scales. Carbon monoxide maxima occur primarily in areas near major roadways and intersections with high traffic density and poor atmospheric ventilation. As these maxima can be predicted by ambient air quality modeling, a large fixed network of CO monitors is not required. Long-term CO monitoring should be confined to a limited number of micro and neighborhood scale stations in large metropolitan areas to measure maximum pollution levels and to determine the effectiveness of control strategies.

Microscale—Measurements on this scale would represent distributions within street canyons, over sidewalks, and near major roadways. The measurements at a particular location in a street canyon would be typical of one high concentration area which can be shown to be a representation of many more areas throughout the street canyon or other similar locations in a city. This is a scale of measurement that would provide valuable information for devising and evaluating ''hot spot'' control measures.

Middle Scale—This category covers dimensions from 100 meters to 0.5 kilometer. In certain cases discussed below, it may apply to regions that have a total length of several kilometers. In many cases of interest, sources and land use may be reasonably homogeneous for long distances along a street, but very inhomogeneous normal to the street. This is the case with strip development and freeway corridors. Included in this category are measurements to characterize the CO concentrations along the urban features just enumerated. When a location is chosen to represent conditions in a block of street development, then the characteristic dimensions of this scale are tens of meters by hundreds of meters. If an attempt is made to characterize street-side conditions throughout the downtown area or along an extended stretch of freeway, the dimensions may be tens of meters by kilometer.

The middle scale would also include the parking lots and feeder streets associated with indirect sources which attract significant numbers of pollutant emitters, particularly autos. Shopping centers, stadia, and office buildings are examples of indirect sources.

Neighborhood Scale—Measurements in this category would represent conditions throughout some reasonably homogeneous urban subregions, with dimensions of a few kilometers and generally more regularly shaped than the middle scale. Homogeneity refers to CO concentration, but it probably also applies to land use. In some cases, a location carefully chosen to provide neighborhood scale data, might represent not only the immediate neighborhood, but also neighborhoods of the same type in other parts of the city. These kinds of stations would provide information relating to health effects because they would represent conditions in areas where people live and work. Neighborhood scale data would provide valuable information for developing, testing, and revising concepts and models that describe the larger scale concentration patterns, especially those models relying on spatially smoothed emission fields for inputs. These types of measurements could also be used for interneighborhood comparisons within or between cities.

After the spatial scale has been determined to meet the monitoring objectives for each location, the location selection procedures, as shown in reference 3 should be used to evaluate the adequacy of each existing CO station and must be used to relocate an existing station or to locate any new SLAMS stations. The background material necessary for these procedures may include the average daily traffic on all streets in the area, wind roses for different hours of the day, and maps showing one-way streets, street widths, and building heights. If the station is to typify the area with the highest concentrations, the streets with the greatest daily traffic should be identified. If some streets are one-way, those streets that have the greatest traffic during the afternoon and evening hours should be selected as tentative locations, because the periods of high traffic volume are usually of greatest duration through the evening hours. However, the strength of the morning inversion has to be considered along with the traffic volume and pattern when seeking areas with the highest concentrations. Traffic counters near the stations will provide valuable data for interpreting the observed CO Concentrations.

Monitors should not be placed in the vicinity of possible anomalous source areas. Examples of such areas include toll gates on turnpikes, metered freeway ramps, and drawbridge approaches. Additional information on network design may be found in reference 3.

2.5 Ozone (O_3) Design Criteria for SLAMS. Ozone is not directly emitted into the atmosphere but results from complex photochemical reactions involving organic compounds, oxides of nitrogen, and solar radiation.

The relationships between primary emissions (precursors) and secondary pollutants (O_3) tend to produce large separations spatially and temporally between the major sources and the areas of high oxidant pollution. This suggests that the meteorological transport process and the relationships between sources and sinks need to be considered in the development of the network design criteria and placement of monitoring stations, especially in measuring peak concentration levels.

The principal spatial scales for SLAMS purposes based on the monitoring objectives are neighborhood, urban, regional, and to a lesser extent, middle scale. Since ozone requires appreciable formation time, the mixing of reactants and products occurs over large volumes of air, and this reduces the importance of monitoring small scale spatial variability.

Middle Scale—Measurement in this scale would represent conditions close to sources of NO_X such as roads where it would be expected that suppression of O_3 concentrations would occur. Trees also may have a strong scavenging effect on O_3 and may tend to suppress O_3 concentrations in their immediate vicinity. Measurements at these stations would represent conditions over relatively small portions of the urban area.

Neighborhood Scale—Measurements in this category represent conditions throughout some reasonably homogeneous urban subregion, with dimensions of a few kilometers. Homogeneity refers to pollutant concentrations. Neighborhood scale data will provide valuable information for developing, testing, and revising concepts and models that describe urban/regional concentration patterns. They 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 station located in the neighborhood scale may also experience peak concentration levels within the urban areas.

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 stations would also be used to measure high concentrations downwind of the area having the highest precursor emissions.

Regional Scale—This scale of measurement will be used to typify concentrations over large portions of a metropolitan area and

even larger areas with dimensions of as much as hundreds of kilometers. Such measurements will be useful for assessing the ozone that is transported into an urban area. Data from such stations may be useful in accounting for the ozone that cannot be reduced by control strategies in that urban area.

The location selection procedure continues after the spatial scale is selected based on the monitoring objectives. The appropriate network design procedures as found in reference 4, should be used to evaluate the adequacy of each existing O_3 monitor and must be used to relocate an existing station or to locate any new O_3 SLAMS stations. The first step in the siting procedure would be to collect the necessary background material, which may consist of maps, emission inventories for nonmethane hydrocarbons and oxides of nitrogen (NO_X), climatological data, and existing air quality data for ozone, nonmethane hydrocarbons, and NO_2/NO.

For locating a neighborhood scale station 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 station 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 most frequent wind speed and direction for periods of important photochemical activity should be determined. Then the prospective monitoring area should be selected in a direction from the city that is most frequently downwind during periods of photochemical activity. The distance from the station to the upwind edge of the city should be about equal to the distance traveled by air moving for 5 to 7 hours at wind speeds prevailing during periods of photochemical activity. Prospective areas for locating O_3 monitors should always be outside the area of major NO_X.

In locating a neighborhood scale station which is to measure high concentrations, the same procedures used for the urban scale are followed except that the station should be located closer to the areas bordering on the center city or slightly further downwind in an area of high density population.

For regional scale background monitoring stations, the most frequent wind associated with important photochemical activity should be determined. The prospective monitoring area should be upwind for the most frequent direction and outside the area of city influence.

Since ozone levels decrease significantly in the colder parts of the year in many areas, ozone is required to be monitored at NAMS and SLAMS monitoring sites only during the ''ozone season'' as designated in the AIRS files on a State by State basis and described below:

OZONE MONITORING SEASON BY STATE

State	Begin month	End month
Alabama	April	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	January	December.
Georgia	April	October.
Hawaii	January	December.
Idaho	April	October.
Illinois	April	October.
Indiana	April	September.
Iowa	April	October.
Kansas	April	October.
Kentucky	April	October.
Louisiana	January	December.
Maine	April	September.
Maryland	April	October.
Massachusetts	April	September.
Michigan	April	September.
Minnesota	April	October.
Mississippi	April	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	April	October.
Pennsylvania	April	October.
Puerto Rico	January	December.
Rhode Island	April	September.
South Carolina	April	October.
South Dakota	June	September.
Tennessee	April	Octber.
Texas AQCR 4,5,7,10,11	January	December
Texas AQCR 1, 2, 3, 6, 8, 9, 12.	March	October
Utah	May	September.
Vermont	April	September.
Virginia	April	October.
Washington	April	October.
West Virginia	April	October.
Wisconsin	April 15	October 15.
Wyoming	April	October.
American Samoa	January	December.
Guam	January	December.
Virgin Islands	January	December.

Additional discussion on the procedures for siting ozone stations may be found in reference 4.

2.6 Nitrogen Dioxide (NO_2) Design Criteria for SLAMS. The typical spatial scales of representativeness associated with nitrogen dioxide monitoring based on monitoring objectives are middle, neighborhood, and urban. Since nitrogen dioxide is primarily formed in

the atmosphere from the oxidation of NO, large volumes of air and mixing times usually reduce the importance of monitoring on small scale spatial variability especially for long averaging times. However, there may be some situations where NO_2 measurements would be made on the middle scale for both long- and short-term averages.

Middle Scale—Measurements on this scale would cover dimensions from about 100 meters to 0.5 kilometer. These measurements would characterize the public exposure to NO_2 in populated areas. Also monitors that are located closer to roadways than the minimum distances specified in table 3 of appendix E of this part, would be represented by measurements on this scale.

Neighborhood and Urban Scales—The same considerations as discussed in section 2.5 for O_3 would also apply to NO_2.

After the spatial scale is selected based on the monitoring objectives, then the siting procedures as found in reference 4 should be used to evaluate the adequacy of each existing NO_2 station and must be used to relocate an existing station or to locate any new NO_2 SLAMS stations. The siting procedures begin with collecting the background material. This background information may include the characteristics of the area and its sources under study, climatological data to determine where concentration maxima are most likely to be found, and any existing monitoring data for NO_2.

For neighborhood or urban scales, the emphasis in site selection will be in finding those areas where long-term averages are expected to be the highest. Nevertheless, it should be expected that the maximum NO_2 concentrations will occur in approximately the same locations as the maximum total oxides of nitrogen concentrations. The best course would be to locate the station somewhat further downwind beyond the expected point of maximum total oxides of nitrogen to allow more time for the formation of NO_2. The dilution of the emissions further downwind from the source should be considered along with the need for reaction time for NO_2 formation in locating stations to measure peak concentration. If dispersion is favorable, maximum concentrations may occur closer to the emission sources than the locations predicted from oxidation of NO to NO_2 alone. This will occur downwind of sources based on winter wind direction or in areas where there are high ozone concentrations and high density NO_2 emissions such as on the fringe of the central business district or further downwind. The distance and direction downwind would be based on ozone season wind patterns.

Once the major emissions areas and wind patterns are known, areas of potential maximum NO_2 levels can be determined. Nitrogen dioxide concentrations are likely to decline rather rapidly outside the urban area. Therefore, the best location for measuring NO_2 concentrations will be in neighborhoods near the edge of the city.

2.7 Lead (Pb) Design Criteria for SLAMS. Presently, about 90 percent of the lead concentration in air originates from automobile exhaust, while the remaining 10 percent comes from industrial processes and stationary combustion sources. (*6*) The most important spatial scales to effectively characterize the emissions from both mobile and stationary sources are the micro, middle, and neighborhood scales. For purposes of establishing monitoring stations to represent large homogeneous areas other than the above scales of representativeness, urban or regional scale stations would also be needed.

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. Because of the very steep ambient Pb gradients resulting from Pb emissions from mobile sources, (*7*) the dimensions of the microscale for Pb generally would not extend beyond 15 meters from the roadway. Emissions from stationary 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 stations provide information for evaluating and developing ''hot-spot'' control measures.

Middle Scale—This scale generally represents lead air quality levels in areas up to several city blocks in size with dimensions on the order of approximately 100 meters to 500 meters. However, the dimensions for middle scale roadway type stations would probably be on the order of 50–150 meters because of the exponential decrease in lead concentration with increasing distances from roadways. The middle scale may for example, include schools and playgrounds in center city areas which are close to major roadways. Pb monitors in such areas are desirable because of the higher sensitivity of children to exposures to Pb concentrations. (*7*) Emissions from point sources frequently impact on areas at which single sites may be located to measure concentrations representing middle spatial scales.

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. Stations 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 lead.

Urban Scale—Such stations would be used to present ambient Pb concentrations over an entire metropolitan area with dimensions in the 4 to 50 kilometer range. An urban scale station would be useful for assessing trends in city-wide air quality and the effectiveness of larger scale air pollution control strategies.

Regional Scale—Measurements from these stations would characterize air quality levels over areas having dimensions of 50 to hundreds of kilometers. This large scale of representativeness would be most applicable to sparsely populated areas and could provide information on background air quality and interregional pollutant transport.

Monitoring data for ambient Pb levels are required in major urbanized areas, particularly where Pb levels have been shown or are expected to be of significant concern such locations are to be expected in urban areas having high population densities and accompanying high traffic densities. The total number and type of stations for SLAMS are not prescribed but must be determined on a case-by-case basis. As a minimum there must be two stations in any urbanized area which has a population exceeding 500,000. Also, as a minimum, there must be two stations in any area where lead concentrations currently exceed or have exceeded 1.5 mu;g/m^3 quarterly arithmetic mean measured since January 1, 1974. For those areas less than 500,000 population where the lead concentrations have exceeded 1.5 mu;g/m^3 quarterly arithmetic mean, the Regional Administrator may waive the requirement for establishing SLAMS provided the State can demonstrate that measured lead concentrations have not exceeded the NAAQS for the eight quarters prceeding the lead monitoring plan submission required by §58.20. For locations where monitors are not being operated at the time of the Pb monitoring plan submission, data showing attainment during the final eight quarters of operation will generally provide the basis for the waiver. The EPA Regional Administrator may specify more than two monitoring stations if it is found that two stations are insufficient to adequately determine if the Pb standard is being attained and maintained. The Regional Administrator may also specify that stations be located in areas outside the boundaries of the urbanized areas.

Concerning the previously discussed required minimum of two stations, one of the stations must be a category (a) type station and the second a category (b) station. Both of these categories of stations are defined in section 3. For areas where the predominant lead levels come from automotive sources, the category (a) station must be a microscale or middle scale station located near a major roadway [>30,000 average daily traffic, (ADT)] in order to measure maximum Pb concentrations from mobile sources. In areas where there are no roadways exceeding 30,000 ADT, the station should be located near the roadway with the largest traffic volume. Studies (7, 8) indicate that lead levels decrease exponentially with distance from roadways. Thus, the higher concentrations are close to the roadway and stations located in such areas because of the steep concentration gradients, are most often found to represent the microscale and middle scale dimension. For areas where predominant lead levels come from point sources, the category (a) station generally represents the microscale or middle scale impact of the point source. However, in a few cases, sufficient mixing may occur during transport of the emissions from the source to the ground so that the category (a) station represents a neighborhood scale. The required category (b) station must be a neighborhood scale station since the microscale and middle scale station would not represent the air quality over large geographical areas and frequently may not be located in highly populated areas. It is recognized that in certain areas, a middle scale station may be located at schools or playgrounds near major roadways. However, in most cases, they are not located in such areas and since children (7) are the segment of the population most susceptible to the effects of lead and are more likely to live and play in the residential section of the urban area, the category (b) station should be located in residential areas having a combination of high population and traffic density. In the case where lead levels come primarily from point sources, the category (b) station generally represents a neighborhood scale impact of the point source.

To locate monitoring stations, it will be necessary to obtain background information such as stationary and mobile source emissions inventories, morning and evening traffic patterns, climatological summaries, and local geographical characteristics. Such information should be used to identify areas that are most suitable to the particular monitoring objective and spatial scale of representativeness desired. Reference 9 provides additional guidance on locating sites to meet specific urban area monitoring objectives and must be used in locating new stations or evaluating the adequacy of existing stations.

After locating each Pb station, and, to the extent practicable, taking into consideration the collective impact of all Pb sources and surrounding physical characteristics of the siting area, a spatial scale of representativeness must be assigned to each station.

Guidance on locating monitoring stations in the vicinity of stationary lead sources is given in reference 10. This reference provides assistance in designing a network to meet the monitoring objective of determining the

impact of point sources on ambient Pb levels.

2.8 PM_{10} Design Criteria for SLAMS. As with other pollutants measured in the SLAMS network, the first step in designing the PM_{10} network is to collect the necessary background information. Various studies[11, 12, 13, 14, 15, 16] have documented the major source categories of particulate matter and their contribution to ambient levels in various locations throughout the country. Because the sources for PM_{10} are similar to those for TSP, the procedures for collecting the necessary background information for PM_{10} are also similar. Sources of background information would be regional and traffic maps and aerial photographs showing topography, settlements, major industries and highways. These maps and photographs would be used to identify areas of the type that are of concern to the particular monitoring objective. After potentially suitable monitoring areas for PM_{10} have been identified on a map, modeling may be used to provide an estimate of PM_{10} concentrations throughout the area of interest. After completing the first step, existing TSP SLAMS or other particulate matter stations should be evaluated to determine their potential as candidates for SLAMS designation. Stations meeting one or more of the four basic monitoring objectives described in section 1 of this appendix must be classified into one of the five scales of representativeness (micro, middle, neighborhood, urban and regional) if the stations are to become SLAMS. In siting and classifying PM_{10} stations, the procedures in reference 17 should be used.

If existing TSP samplers meet the quality assurance requirements of appendix A, the PM_{10} siting requirements of appendix E, and are located in areas of suspected maximum concentrations are described in section 3 of appendix D, and if the TSP levels are below the ambient PM_{10} standards, TSP samplers may continue to be used as substitutes for PM_{10} SLAMS samplers under the provisions of section 2.2 of appendix C.

The most important spatial scales to effectively characterize the emissions of PM_{10} from both mobile and stationary sources are the micro, middle and neighborhood scales. For purposes of establishing monitoring stations to represent large homogenous areas other than the above scales of representativeness, urban or regional scale stations would also be needed.

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. Because of the very steep ambient PM_{10} gradients resulting from mobile sources, the dimensions of the microscale for PM_{10} generally would not extend beyond 15 meters from the roadway, but could continue the length of the roadway which could be several kilometers. Microscale PM_{10} 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 stations provide information for evaluating and developing ''hotspot'' control measures.

Middle Scale—Much of the measurement of short-term public exposure to PM_{10} is on this scale. People moving through downtown areas, or living near major roadways, encounter particles that would be adequately characterized by measurements of this spatial scale. Thus, measurements of this type would be appropriate for the evaluation of possible short-term public health effects of particulate matter pollution. 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 seldom swept parking lots associated with these sources could be an important source in addition to the vehicular emissions themselves.

Neighborhood Scale—Measurements in this category would represent conditions throughout some reasonably homogeneous urban subregion with dimensions of a few kilometers and of generally more regular shape than the middle scale. Homogeneity refers to the PM_{10} 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. Stations 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. This category also includes industrial and commercial neighborhoods, as well as residential.

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. This is the most likely scale of measurements to meet the needs of planners.

Urban Scale—This class of measurement would be made to characterize the PM_{10} concentration over an entire metropolitan area. Such measurements would be useful for assessing trends in city-wide air quality, and hence, the effectiveness of large scale air pollution control strategies.

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 with reasonably uniform ground cover. Data characteristics of this scale would provide information about larger scale processes of PM_{10} emissions, losses and transport.

3. *Network Design for National Air Monitoring Stations (NAMS)*

The NAMS must be stations selected from the SLAMS network with emphasis given to urban and multisource areas. Areas to be monitored must be selected based on urbanized population and pollutant concentration levels. Generally, a larger number of NAMS are needed in more polluted urban and multisource areas. The network design criteria discussed below reflect these concepts. However, it should be emphasized that deviations from the NAMS network design criteria may be necessary in a few cases. Thus, these design criteria are not a set of rigid rules but rather a guide for achieving a proper distribution of monitoring sites on a national scale.

The primary objective for NAMS is to monitor in the areas where the pollutant concentration and the population exposure are expected to be the highest consistent with the averaging time of the NAAQS. Accordingly, the NAMS fall into two categories:

Category (a): Stations located in area(s) of expected maximum concentrations (generally microscale for CO, microscale or middle scale for Pb and PM_{10}, neighborhood scale for SO_2, and NO_2, and urban scale for O_3.

Category (b): Stations which combine poor air quality with a high population density but not necessarily located in an area of expected maximum concentrations (neighborhood scale, except urban scale for NO_2). Category (b) monitors would generally be representative of larger spatial scales than category (a) monitors.

For each urban area where NAMS are required, both categories of monitoring stations must be established. In the case of TSP and SO_2 if only one NAMS is needed, then category (a) must be used. The analysis and interpretation of data from NAMS should consider the distinction between these types of stations as appropriate.

The concept of NAMS is designed to provide data for national policy analyses/trends and for reporting to the public on major metropolitan areas. It is not the intent to monitor in every area where the NAAQS are violated. On the other hand, the data from SLAMS should be used primarily for nonattainment decisions/ analyses in specific geographical areas. Since the NAMS are stations from the SLAMS network, station locating procedures for NAMS are part of the SLAMS network design process.

3.1 [Reserved]

3.2 Sulfur Dioxide (SO_2) Design Criteria for NAMS. It is desirable to have a greater number of NAMS in the more polluted and densely populated urban and multisource areas. The data in table 3 show the approximate number of permanent stations needed in urban areas to characterize the national and regional SO_2 air quality trends and geographical patterns. These criteria require that the number of NAMS in areas where urban populations exceed 1,000,000 and concentrations also exceed the primary NAAQS may range from 6 to 10 and that in areas where the SO_2 problem is minor, only one or two (or no) monitors are required. For those cases where more than one station is required for an urban area, there should be at least one station for category (a) and category (b) objectives as discussed in section 3. Where three or more stations are required, the mix of category (a) and (b) stations is determined on a case-by-case basis. The actual number and location of the NAMS must be determined by EPA Regional Offices and the State agency, subject to the approval of EPA Headquarters Office of Air and Radiation (OAR).

TABLE 3—SO_2 NATIONAL AIR MONITORING STATION CRITERIA

[Approximate number of stations per area] [a]

Population category	High concentration [b]	Medium concentration [c]	Low concentration [d]
>1,000,000	6–10	4–8	2–4
500,000 to 1,000,000	4–8	2–4	1–2
250,000 to 500,000	3–4	1–2	0–1
100,000 to 250,000	1–2	0–1	0

[a] Selection of urban areas and actual number of stations per area will be jointly determined by EPA and the State agency.

[b] High concentration—exceeding level of the primary NAAQS.

[c] Medium concentration—exceeding 60 percent of the level of the primary or 100% of the secondary NAAQS.

[d] Low concentration—less than 60 percent of the level of the primary or 100% of the secondary NAAQS.

The estimated number of SO_2 NAMS which would be required nationwide ranges from approximately 200 to 300. This number of NAMS SO_2 monitors is sufficient for national trend purposes due to the low background SO_2 levels, and the fact that air quality is very sensitive to SO_2 emission changes. The

actual number of stations in any specific area depends on local factors such as meteorology, topography, urban and regional air quality gradients, and the potential for significant air quality improvements or degradation. The greatest density of stations should be where urban populations are large and where pollution levels are high. Fewer NAMS are necessary in the western States since concentrations are seldom above the NAAQS in their urban areas. Exceptions to this are in the areas where an expected shortage of clean fuels indicates that ambient air quality may be degraded by increased SO_2 emissions. In such cases, a minimum number of NAMS is required to provide EPA with a proper national perspective on significant changes in air quality.

Like TSP, the worst air quality in an urban area is to be used as the basis for determining the required number of SO_2 NAMS (see table 3). This includes SO_2 air quality levels within populated parts of urbanized areas, that are affected by one or two point sources of SO_2 if the impact of the source(s) extends over a reasonably broad geographic scale (neighborhood or larger). Maximum SO_2 air quality levels in remote unpopulated areas should be excluded as a basis for selecting NAMS regardless of the sources affecting the concentration levels. Such remote areas are more appropriately monitored by SLAMS or SPM networks and/or characterized by diffusion model calculations as necessary.

3.3 Carbon Monoxide (CO) Design Criteria for NAMS. Information is needed on ambient CO levels in major urbanized areas where CO levels have been shown or inferred to be a significant concern. At the national level, EPA will not routinely require data from as many stations as are required for TSP, and perhaps, SO_2, since CO trend stations are principally needed to assess the overall air quality progress resulting from the emission controls required by the Federal motor vehicle control program (FMVCP).

Although State and local air programs may require extensive monitoring to document and measure the local impacts of CO emissions and emission controls, an adequate national perspective is possible with as few as two stations per major urban area. The two categories for which CO NAMS would be required are: (a) Peak concentration areas such as are found around major traffic arteries and near heavily traveled streets in downtown areas (micro scale); and (b) neighborhoods where concentration exposures are significant (middle scale, neighborhood scale).

The peak concentration station (micro scale) is usually found near heavily traveled downtown streets (street canyons), but could be found along major arterials (corridors), either near intersections or at low elevations which are influenced by downslope drainage patterns under low inversion conditions. The peak concentration station should be located so that it is representative of several similar source configurations in the urban area, where the general population has access. Thus, it should reflect one of many potential peak situations which occur throughout the urban area. It is recognized that this does not measure air quality which represents large geographical areas. Thus, a second type of station on the neighborhood scale is necessary to provide data representative of the high concentration levels which exist over large geographical areas.

The category (b) (middle scale or neighborhood scale) should be located in areas with a stable, high population density, projected continuity of neighborhood character, and high traffic density. The stations should be located where no major zoning changes, new highways, or new shopping centers are being considered. The station should be where a significant CO pollution problem exists, but not be unduly influenced by any one line source. Rather, it should be more representative of the overall effect of the sources in a significant portion of the urban area.

Because CO is generally associated with heavy traffic and population clusters, an urbanized area with a population greater than 500,000 is the principal critertion for identifying the urban areas for which pairs of NAMS for this pollutant will be required. The criterion is based on judgment that stations in urban areas with greater than 500,000 population would provide sufficient data for national analysis and national reporting to Congress and the public. Also, it has generally been shown that major CO problems are found in areas greater than 500,000 population.

3.4 Ozone (O_3) Design Criteria for NAMS. The criterion for selecting locations for ozone NAMS is any urbanized area having a population of more than 200,000. This population cut off is used since the sources of hydrocarbons are both mobile and stationary and are more diverse. Also, because of local and national control strategies and the complex chemical process of ozone formation and transport, more sampling stations than for CO are needed on a national scale to better understand the ozone problem. This selection criterion is based entirely on population and will include those relatively highly populated areas where most of the oxidant precursors originate.

Each urban area will generally require only two ozone NAMS, One station would be representative of maximum ozone concentrations (category (a), urban scale) under the wind transport conditions as discussed in section 2.5. The exact location should balance local factors affecting transport and buildup of peak O_3 levels with the need to represent population exposure. The second station (category (b), neighborhood scale),

should be representative of high density population areas on the fringes of the central business district along the predominant summer/fall daytime wind direction. This latter station should measure peak O_3 levels under light and variable or stagnant wind conditions. Two ozone NAMS stations will be sufficient in most urban areas since spatial gradients for ozone generally are not as sharp as for other criteria pollutants.

3.5 Nitrogen Dioxide (NO_2) Criteria for NAMS. Nitrogen dioxide NAMS will be required in those areas of the country which have a population greater than 1,000,000. These areas will have two NO_2 NAMS. It is felt that stations in these major metropolitan areas would provide sufficient data for a national analysis of the data, and also because NO_2 problems occur in areas of greater than 1,000,000 population.

Within urban areas requiring NAMS, two permanent monitors are sufficient. The first station (category (a), middle scale or neighborhood scale) would be to measure the photochemical production of NO_2 and would best be located in that part of the urban area where the emission density of NO_X is the highest. The second station (category (b) urban scale), would be to measure the NO_2 produced from the reaction of NO with O_3 and should be downwind of the area of peak NO_X emission areas.

3.6 Lead (Pb) Design Criteria for NAMS. In order to achieve the national monitoring objective, two of the SLAMS located in urbanized areas with populations greater than 500,000 will be designated as NAMS. One of the stations must be a microscale or middle scale category (a) station, located adjacent to a major roadway (≥30,000 ADT) or near the roadway with the largest traffic volume if the volume is less than 30,000 ADT. A microscale location is preferred, but a middle scale is also acceptable if a suitable microscale location cannot be found.

The second station must be a neighborhood scale category (b) station located in a highly populated residential section of the urbanized area where traffic density is high, preferably (≥30,000 ADT) or near the roadway with the largest traffic volume if the volume is less than 30,000 ADT.

In certain urbanized areas greater than 500,000 population, point sources may have a significant impact on air quality lead levels in populated areas. To measure the impact of such sources, other monitors in the SLAMS network would normally be used.

3.7 PM_{10}, Design Criteria for NAMS. Table 4 indicates the approximate number of permanent stations required in urban areas to characterize national and regional PM_{10} air quality trends and geographical patterns. The number of stations in areas where urban 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 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.

It is recognized that no PM_{10} samplers will be designated as PM_{10} reference or equivalent methods until, at the earliest, approximately six months after promulgation of PM_{10} NAAQS and the reference and equivalent method requirements. Even though nondesignated PM_{10} samplers will have been commercially available, and a small number of samplers will have been in use by EPA, other agencies, and industry, there will not be enough ambient PM_{10} data to determine ambient PM_{10} levels for all areas of the country. Accordingly, EPA has provided guidance[18] on converting ambient IP_{15} data to ambient PM_{10} data. Ambient IP_{15} data are data from high volume samplers utilizing quartz filters or dichotomous samplers, both with inlets designed to collect particles nominally 15 um and below. Also included in the guidance are procedures for calculating from ambient TSP data the probability that an area will be nonattainment for PM_{10}. For determining the appropriate number of NAMS per area, the converted IP_{15} data or the probabilities of PM_{10} nonattainment are used in table 4, unless ambient PM_{10} data are available. If only one monitor is required in an urbanized area, it must be a category (a) type. Since emissions associated with the operation of motor vehicles contribute to urban area particulate matter levels, consideration of the impact of these sources must be included in the design of the NAMS network, particularly in urban areas greater than 500,000 population. In certain urban areas particulate emissions from motor vehicle diesel exhaust currently is or is expected to be a significant source of PM_{10} ambient levels. If an evaluation of the sources of PM_{10} as described in section 2.8 indicates that the maximum concentration area is predominantly influenced by roadway emissions, then the category (a) station should be located adjacent to a major road and should be a microscale or middle scale. A microscale is preferable but a middle scale is also acceptable if a suitable microscale location cannot be found. However, if the predominant influence in the suspected maximum concentration area is expected to be industrial emissions, and/or combustion products (from other than an isolated single source), the category (a) station should be a middle scale or neighborhood scale. A middle scale exposure is preferable to a neighborhood scale in representing the maximum concentration impact from multiple sources, other than vehicular, but a neighborhood scale is acceptable, especially in large residential areas

that burn oil, wood, and/or coal for space heating.

For those cases where more than one station is required for an urban area, there should be at least one station for category (a) and one station for category (b) neighborhood scale objectives as discussed in section 3. Where three or more stations are required, the mix of category (a) and (b) stations is to be determined on a case-by-case basis. The actual number of NAMS and their locations must be determined by EPA Regional Offices and the State agencies, subject to the approval of the Administrator as required by §58.32. The Administrator's approval is necessary to insure that individual stations conform to the NAMS selection criteria and that the network as a whole is sufficient in terms of number and location for purposes of national analyses. As required under the provisions of section 2.2 of appendix C, all PM_{10} NAMS that were previously designated as TSP NAMS must concurrently collect ambient TSP and PM_{10} data for a one–year period beginning when each NAMS PM_{10} sampler is put into operation.

TABLE 4—PM_{10} NATIONAL AIR MONITORING STATION CRITERIA

[Approximate Number of Stations per Area] [a]

Population category	High concentration [b,e]	Medium concentration [c,e]	Low concentration [d,e]
>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

[a] Selection of urban areas and actual number of stations per area will be jointly determined by EPA and the State agency.

[b] High concentration areas are those for which: Ambient PM_{10} data or ambient IP_{15} data converted to PM_{10} show ambient concentrations exceeding either PM_{10} NAAQS by 20 percent or more; or the probability of PM_{10} nonattainment, calculated from TSP data, is 95 percent or greater.

[c] Medium concentration areas are those for which: Ambient PM_{10} data or ambient IP_{15} data converted to PM_{10} show ambient concentrations exceeding either 80 percent of the PM_{10} NAAQS, or the probability of PM_{10} nonattainment, calculated from TSP data, is ≥20 percent and >95 percent.

[d] Low concentration areas are those for which: Ambient PM_{10} data or ambient IP_{15} data converted to PM_{10} show ambient concentrations less than 80 percent of the PM_{10} NAAQS; or the probability of PM_{10} nonattainment, calculated from TSP data, is less than 20 percent.

[e] Procedures for estimating ambient PM_{10} concentrations from IP_{15} ambient air measurements or for estimating the probability of nonattainment for PM_{10} given observed TSP data are provided in reference 18.

4. *Network Design for Photochemical Assessment Monitoring Stations (PAMS)*

In order to obtain more comprehensive and representative data on O_3 air pollution, the 1990 Clean Air Act Amendments require enhanced monitoring for ozone (O_3), oxides of nitrogen (NO, NO_2, and NO_X), and monitoring for VOC in O_3 nonattainment areas classified as serious, severe, or extreme. This will be accomplished through the establishment of a network of Photochemical Assessment Monitoring Stations (PAMS).

4.1 PAMS Data Uses. Data from the PAMS are intended to satisfy several coincident needs related to attainment of the National Ambient Air Quality Standards (NAAQS), SIP control strategy development and evaluation, corroboration of emissions tracking, preparation of trends appraisals, and exposure assessment.

(a) *NAAQS attainment and control strategy development.* Like SLAMS and NAMS data, PAMS data will be used for monitoring O_3 exceedances and providing input for attainment/nonattainment decisions. In addition, PAMS data will help resolve the roles of transported and locally emitted O_3 precursors in producing an observed exceedance and may be utilized to identify specific sources emitting excessive concentrations of O_3 precursors and potentially contributing to observed exceedances of the O_3 NAAQS. The PAMS data will enhance the characterization of O_3 concentrations and provide critical information on the precursors which cause O_3, therefore extending the database available for future attainment demonstrations. These demonstrations will be based on photochemical grid modeling and other approved analytical methods and will provide a basis for prospective mid-course control strategy corrections. PAMS data will provide information concerning (1) which areas and episodes to model to develop appropriate control strategies; (2) boundary conditions required by the models to produce quantifiable estimates of needed emissions reductions; and (3) the evaluation of the predictive capability of the models used.

(b) *SIP control strategy evaluation.* The PAMS will provide data for SIP control strategy evaluation. Long-term PAMS data will be used to evaluate the effectiveness of these control strategies. Data may be used to evaluate the impact of VOC and NO_X emission reductions on air quality levels for O_3 if data is reviewed following the time period during which control measures were implemented. Speciation of measured VOC data will allow determination of which organic species are most affected by the emissions reductions and assist in developing cost-effective, selective VOC reductions and control strategies. A State or local air pollution control agency can therefore ensure that strategies which are implemented in their particular nonattainment area are those which are best suited for that area and achieve the most effective emissions reductions (and therefore largest impact) at the least cost.

(c) *Emissions tracking.* PAMS data will be used to corroborate the quality of VOC and NO_X emission inventories. Although a perfect mathematical relationship between

emission inventories and ambient measurements does not yet exist, a qualitative assessment of the relative contributions of various compounds to the ambient air can be roughly compared to current emission inventory estimates to evaluate the accuracy of the emission inventories. In addition, PAMS data which are gathered year round will allow tracking of VOC and NO_X emission reductions, provide additional information necessary to support Reasonable Further Progress (RFP) calculations, and corroborate emissions trends analyses. While the regulatory assessments of progress will be made in terms of emission inventory estimates, the ambient data can provide independent trends analyses and corroboration of these assessments which either verify or highlight possible errors in emissions trends indicated by inventories. The ambient assessments, using speciated data, can gauge the accuracy of estimated changes in emissions. The speciated data can also be used to assess the quality of the VOC speciated and NO_X emission inventories for input during photochemical grid modeling exercises and identify potential urban air toxic pollutant problems which deserve closer scrutiny.

The speciated VOC data will be used to determine changes in the species profile, resulting from the emission control program, particularly those resulting from the reformulation of fuels.

(d) *Trends.* Long-term PAMS data will be used to establish speciated VOC, NO_X, and limited toxic air pollutant trends, and supplement the O_3 trends database. Multiple statistical indicators will be tracked, including O_3 and its precursors during the events encompassing the days during each year with the highest O_3 concentrations, the seasonal means for these pollutants, and the annual means at representative locations.

The more PAMS that are established in and near nonattainment areas, the more effective the trends data will become. As the spatial distribution and number of O_3 and O_3 precursor monitors improves, trends analyses will be less influenced by instrument or site location anomalies. The requirement that surface meteorological monitoring be established at each PAMS will help maximize the utility of these trends analyses by comparisons with meteorological trends, and transport influences. The meteorological data can also help interpret the ambient air pollution trends by taking meteorological factors into account.

(e) *Exposure assessment.* PAMS data will be used to better characterize O_3 and toxic air pollutant exposure to populations living in serious, severe, or extreme areas. Annual mean toxic air pollutant concentrations will be calculated to help estimate the average risk to the population associated with individual VOC species, which are considered toxic, in urban environments.

4.2 PAMS Monitoring Objectives. Unlike the SLAMS and NAMS design criteria which are pollutant specific, PAMS design criteria are site specific. Concurrent measurements of O_3, NO_X, speciated VOC, and meteorology are obtained at PAMS. Design criteria for the PAMS network are based on selection of an array of site 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 into and out of the area, and the photochemical processes related to O_3 nonattainment, as well as developing an initial, though limited, urban air toxic pollutant database. Specific objectives that must be addressed include assessing ambient trends in O_3, NO, NO_2, NO_X, VOC (including carbonyls), and VOC species, determining spatial and diurnal variability of O_3, NO, NO_2, NO_X, and VOC species and assessing changes in the VOC species profiles that occur over time, particularly those occurring due to the reformulation of fuels. A maximum of five PAMS sites are required in an affected nonattainment area depending on the population of the Metropolitan Statistical Area/Consolidated Metropolitan Statistical Area (MSA/CMSA) or nonattainment area, whichever is larger. Specific monitoring objectives associated with each of these sites result in four distinct site types. Note that detailed guidance for the locating of these sites may be found in reference 19.

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 overwhelming transport. Type (1) sites are located in the predominant morning upwind direction from the local area of maximum precursor emissions during the O_3 season and at a distance sufficient to obtain urban scale measurements as defined in section 1 of this appendix. Typically, type (1) sites will be located near the edge of the photochemical grid model domain in the predominant morning upwind direction from the city limits or fringe of the urbanized area. Depending on the boundaries and size of the nonattainment area and the orientation of the grid, this site may be located outside of the nonattainment area. The appropriate predominant morning wind direction should be determined from historical wind data occurring during the period 7 a.m. to 10 a.m. on high O_3 days or on those days which exhibit the potential for producing high O_3 levels, i.e., O_3-conducive days as described in reference 25. Alternate schemes for specifying this morning wind direction may be submitted as a part of the network description required by §§58.40 and 58.41. Data measured

at type (1) sites will be used principally for the following purposes:

• Future development and evaluation of control strategies,

• Identification of incoming pollutants,

• Corroboration of NO_X and VOC emission inventories,

• Establishment of boundary conditions for future photochemical grid modeling and mid-course control strategy changes, and

• Development of incoming pollutant trends.

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. Type (2) sites are located immediately downwind of the area of maximum precursor emissions and are typically placed near the downwind boundary of the central business district to obtain neighborhood scale measurements. The appropriate downwind direction should be obtained similarly to that for type (1) sites. Additionally, a second type (2) site may be required depending on the size of the area, and should be placed in the second-most predominant morning wind direction as noted previously. Data measured at type (2) sites will be used principally for the following purposes:

• Development and evaluation of imminent and future control strategies,

• Corroboration of NO_X and VOC emission inventories,

• Augmentation of RFP tracking,

• Verification of photochemical grid model performance,

• Characterization of O_3 and toxic air pollutant exposures (appropriate site for measuring toxic emissions impact),

• Development of pollutant trends, particularly toxic air pollutants and annual ambient speciated VOC trends to compare with trends in annual VOC emission estimates, and

• Determination of attainment with the NAAQS for NO_2 and O_3.

Type (3) sites are intended to monitor maximum O_3 concentrations occurring downwind from the area of maximum precursor emissions. Locations for type (3) sites should be chosen so that urban scale measurements are obtained. Typically, type (3) sites will be located 10 to 30 miles downwind from the fringe of the urban area. The downwind direction should also be determined from historical wind data, but should be identified as those afternoon winds occurring during the period 1 p.m. to 4 p.m. on high O_3 days or on those days which exhibit the potential for producing high O_3 levels. Alternate schemes for specifying this afternoon wind direction may also be submitted as a part of the network description required by §§58.40 and 58.41. Data measured at type (3) sites will be used principally for the following purposes:

• Determination of attainment with the NAAQS for O_3 (this site may coincide with an existing maximum concentration O_3 monitoring site),

• Evaluation of future photochemical grid modeling applications,

• Future development and evaluation of control strategies,

• Development of pollutant trends, and

• Characterization of O_3 pollutant exposures.

Type (4) sites are established to characterize the extreme 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. Type (4) sites are located in the predominant afternoon downwind direction, as determined for the type (3) site, from the local area of maximum precursor emissions during the O_3 season and at a distance sufficient to obtain urban scale measurements as defined elsewhere in this appendix. Typically, type (4) sites will be located near the downwind edge of the photochemical grid model domain. Alternate schemes for specifying the location of this site may be submitted as a part of the network description required by §§58.40 and 58.41. Data measured at type (4) sites will be used principally for the following purposes:

• Development and evaluation of O_3 control strategies,

• Identification of emissions and photochemical products leaving the area,

• Establishment of boundary conditions for photochemical grid modeling,

• Development of pollutant trends,

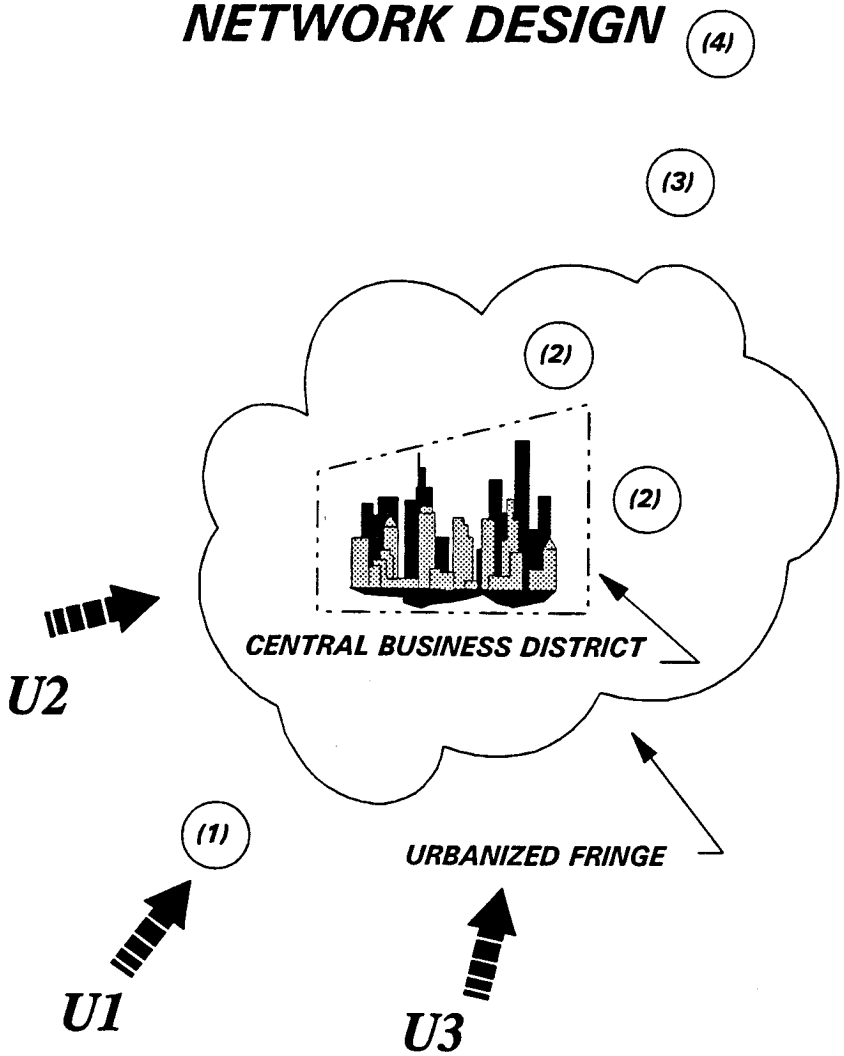
• Background and upwind information for other downwind areas, and

• Evaluation of photochemical grid model performance.

States choosing to submit an individual network description for each affected nonattainment area, irrespective of its proximity to other affected areas, must fulfill the requirements for isolated areas as described in section 4 of appendix D, as an example, and illustrated by Figure 1. States containing areas which experience significant impact from long-range transport or are proximate to other nonattainment areas (even in other States) should collectively submit a network description which contains alternative sites to those that would be required for an isolated area. Such a submittal should, as a guide, be based on the example provided in Figure 2, but must include a demonstration that the design satisfies the monitoring data uses and fulfills the PAMS monitoring objectives described in sections 4.1 and 4.2 of appendix D. EPA recognizes that specific monitoring sites identified for one area may serve to fulfill the monitoring objectives for a different site in another area; for example, a downwind site for one

area may suffice as an upwind site for another. These alternative network designs must also be reviewed and approved by the Administrator.

FIGURE 1 - ISOLATED AREA NETWORK DESIGN



NOTE: U1 AND U2 REPRESENT THE FIRST AND SECOND MOST PREDOMINANT HIGH OZONE DAY MORNING WIND DIRECTION.
U3 REPRESENTS THE HIGH OZONE DAY AFTERNOON WIND DIRECTION.

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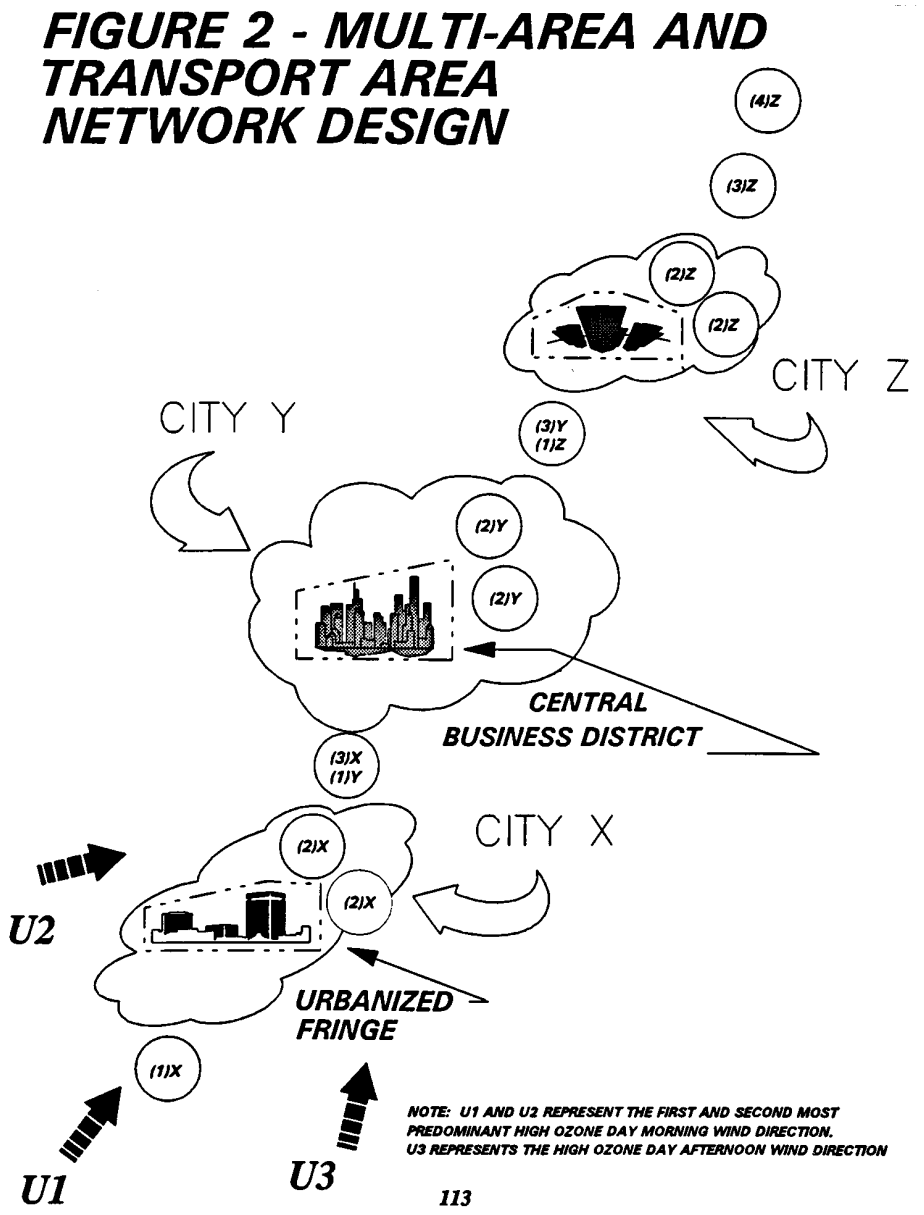

Alternative PAMS network designs should, on a site-by-site basis, provide those data necessary to enhance the attainment/non-attainment database for criteria pollutants and explain the origins of overwhelming O_3 transport. The alternative PAMS data should be usable for the corroboration and verification of O_3 precursor emissions inventories and should comprise a qualitative (if not quantitative) measure of the accuracy of

RFP calculations. The data should be sufficient to evaluate the effectiveness of the implemented O_3 control strategies and should provide data necessary to establish photochemical grid modeling boundary conditions and necessary inputs including appropriate meteorological parameters, and provide measurements which can serve as model evaluation tools. Further, utilizing its PAMS database (alternative or not), a State should be able to draw conclusions regarding population exposure and conduct trends analyses for both criteria and non-criteria pollutants. Overall, the PAMS network should serve as one of several complementary means, together with modeling and analysis of other data bases (e.g., inventories) and availability of control technology, etc., for States to justify the modification of existing control programs, design new programs, and evaluate future courses of actions for O_3 control.

4.3 Monitoring Period. PAMS precursor monitoring will be conducted annually throughout the months of June, July and August (as a minimum) when peak O_3 values are expected in each area; however, precursor monitoring during the entire O_3 season for the area is preferred. Alternate precursor monitoring periods may be submitted for approval as a part of the PAMS network description required by §58.40. Changes to the PAMS monitoring period must be identified during the annual SLAMS Network Review specified in §58.20. PAMS O_3 monitors must adhere to the O_3 monitoring season specified in section 2.5 of appendix D. To ensure a degree of national consistency, monitoring for the 1993 season should commence as follows:

One in 3-day sampling—June 3, 1993.

One in 6-day sampling—June 6, 1993.

These monitoring dates will thereby be coincident with the previously-established, intermittent schedule for particulate matter. States initiating sampling earlier (or later) than June 3, 1993 should adjust their schedules to coincide with this national schedule.

4.4 Minimum Monitoring Network Requirements. The minimum required number and type of monitoring sites and sampling requirements are based on the population of the affected MSA/CMSA or nonattainment area (whichever is larger). The MSA/CMSA basis for monitoring network requirements was chosen because it typically is the most representative of the area which encompasses the emissions sources contributing to nonattainment. The MSA/CMSA emissions density can also be effectively and conveniently portrayed by the surrogate of population. Additionally, a network which is adequate to characterize the ambient air of an MSA/CMSA often must extend beyond the boundaries of such an area (especially for O_3 and its precursors); therefore, the use of smaller geographical units (such as counties or nonattainment areas which are smaller than the MSA/CMSA) for monitoring network design purposes is inappropriate. Various sampling requirements are imposed according to the size of the area to accommodate the impact of transport on the smaller MSAs/CMSAs, to account for the spatial variations inherent in large areas, to satisfy the differing data needs of large versus small areas due to the intractability of the O_3 nonattainment problem, and to recognize the potential economic impact of implementation on State and local government. Population figures must reflect the most recent decennial U.S. census population report. Specific guidance on determining network requirements is provided in reference 19. Minimum network requirements are outlined in table 2.

TABLE 2—PAMS MINIMUM MONITORING NETWORK REQUIREMENTS [1]

Population of MSA/CMSA or nonattainment area [2]	Required site type [3]	Minimum speciated VOC sampling frequency [4]	Minimum carbonyl sampling frequency [4]
Less than 500,000	(1)	A or C	
	(2)	A or C	D or F [5]
500,000 to 1,000,000	(1)	A or C	
	(2)	B	E
	(3)	A or C	
1,000,000 to 2,000,000	(1)	A or C	
	(2)	B	E
	(2)	B	E
	(3)	A or C	
More than 2,000,000	(1)	A or C	
	(2)	B	E
	(2)	B	E
	(3)	A or C	
	(4)	A or C	

[1] O_3 and NO_X (including NO and NO_2) monitoring should be continuous measurements.

[2] Whichever area is larger.

[3] See Figure 1.

[4] Frequency Requirements are as follows: A—Eight 3-hour samples every third day and one additional 24-hour sample every sixth day during the monitoring period; B—Eight 3-hour samples, every day during the monitoring period and one additional 24-hour sample every sixth day year-round; C—Eight 3-hour samples on the 5 peak O_3 days plus each previous day, eight 3-hour samples every sixth day, and one additional 24-hour sample every sixth day, during the monitoring period; D—Eight 3-hour samples every third day during the monitoring period; E—Eight 3-hour samples every day during the monitoring period; F—Eight 3-hour samples on the 5 peak O_3 days plus each previous day and eight 3-hour samples every sixth day during the monitoring period. (NOTE: multiple samples taken on a daily basis must begin at midnight and consist of sequential, non-overlapping sampling periods.)

[5] Carbonyl sampling frequency must match the chosen speciated VOC frequency.

Note that the use of Frequencies C or F requires the submittal of an ozone event forecasting scheme.

For purposes of network implementation and transition, EPA recommends the following priority order for the establishment of sites:

- The type (2) site which provides the most comprehensive data concerning O_3 precursor emissions and toxic air pollutants,

• The type (3) site which provides a maximum O_3 measurement and total conversion of O_3 precursors,

• The type (1) site which delineates the effect of incoming precursor emissions and concentrations of O_3 and provides upwind boundary conditions,

• The type (4) site which provides extreme downwind boundary conditions, and

• The second type (2) site which provides comprehensive data concerning O_3 precursor emissions and toxic air pollutants in the second-most predominant morning wind direction on high O_3 days.

Note also that O_3 event (peak day) monitoring will require the development of a scheme for forecasting such high O_3 days or will necessitate the stipulation of what meteorological conditions constitute a potential high O_3 day; monitoring could then be triggered only via meteorological projections. The O_3 event forecasting and monitoring scheme should be submitted as a part of the network description required by §§58.40 and 58.41 and should be reviewed during each annual SLAMS Network Review specified in §58.20.

4.5 Transition Period. A variable period of time is proposed for phasing in the operation of all required PAMS. Within 1 year after (1) February 12, 1993, (2) or date of redesignation or reclassification of any existing O_3 nonattainment area to serious, severe, or extreme, or (3) the designation of a new area and classification to serious, severe, or extreme O_3 nonattainment, a minimum of one type (2) site must be operating. Operation of the remaining sites 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.

4.6 Meteorological Monitoring. In order to support monitoring objectives associated with the need for various air quality analyses, model inputs and performance evaluations, meteorological monitoring including wind measurements at 10 meters above ground is required at each PAMS site. Monitoring should begin with site establishment. In addition, upper air meteorological monitoring is required for each PAMS area. Upper air monitoring should be initiated as soon as possible, but no later than 2 years after (1) February 12, 1993, (2) or date of redesignation or reclassification of any existing O_3 nonattainment area to serious, severe, or extreme, or (3) the designation of a new area and classification to serious, severe, or extreme O_3 nonattainment. The upper air monitoring site may be located separately from the type (1) through (4) sites, but the location should be representative of the upper air data in the nonattainment area. Upper air meteorological data must be collected during those days specified for monitoring by the sampling frequencies in table 2. of section 4.4 of this appendix D in accordance with current EPA guidance.

5. *Summary*

Table 5 shows by pollutant, all of the spatial scales that are applicable for SLAMS and the required spatial scales for NAMS. There may also be some situations, as discussed later in appendix E, where additional scales may be allowed for NAMS purposes.

TABLE 5—SUMMARY OF SPATIAL SCALES FOR SLAMS AND REQUIRED SCALES FOR NAMS

Spatial Scale	Scale Applicable for SLAMS						Scales Required for NAMS					
	SO_2	CO	O_3	NO_2	Pb	PM_{10}	SO_2	CO	O_3	NO_2	Pb	PM_{10}
Micro		✔			✔	✔		✔			✔	✔
Middle	✔	✔	✔	✔	✔	✔					✔	✔
Neighborhood	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Urban	✔		✔	✔	✔	✔			✔	✔		
Regional	✔		✔		✔	✔						

6. *References*

1. Ludwig, F. L., J. H. S. Kealoha, and E. Shelar. Selecting Sites for Monitoring Total Suspended Particulates. Stanford Research Institute, Menlo Park, CA. Prepared for U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA Publication No. EPA–450/3–77–018. June 1977, revised December 1977.

2. 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.

3. Ludwig, F. L. and J. H. S. Kealoha. Selecting Sites for Carbon Monoxide Monitoring. Stanford Research Institute, Menlo Park, CA. Prepared for U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA Publication No. EPA–450/3–75–077. September 1975.

4. Ludwig, F. L. and E. Shelar. Site Selecting for the Monitoring of Photochemical Air Pollutants. Stanford Research Institute,

Menlo Park, CA. Prepared for U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA Publication No. EPA–450/3–78–013. April 1978.

5. Guideline on Air Quality Models. OAQPS, U.S. Environmental Protection Agency, Research Triangle Park, NC. OAQPS No. 1.2–080. April 1978.

6. Control Techniques for Lead Air Emissions, OAQPS, U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA–450/2–77–012. December 1977.

7. Air Quality Criteria for Lead. Office of Research and Development, U.S. Environmental Protection Agency, Washington, DC. EPA–600/8–77–017. December 1977.

8. Johnson, D. E., et al. Epidemiologic Study of the Effects of Automobile Traffic on Blood Lead Levels, Southwest Research Institute, Houston, TX. Prepared for U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA–600/1–78–055. August 1978.

9. 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.)

10. Guidance for Lead Monitoring in the Vicinity of Point Sources. Office of Air Quality Planning and Standards, and Environmental Monitoring Systems Laboratory, U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA–450/4–81–006. January 1981.

11. Cooper, J.A., et. al. Summary of the Portland Aerosol Characterization Study. (Presented at the 1979 Annual Air Pollution Association Meeting, Cincinnati, OH. APCA #79–24.4).

12. Bradway, R.M. and F.A. Record. National Assessment of the Urban Particulate Problem. Volume 1. Prepared for U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA–450/3–76–024. July 1976.

13. U.S. Environmental Protection Agency, Air Quality Criteria for Particulate Matter and Sulfur Oxides, Volume 2. Environmental Criteria and Assessment Office, Research Triangle Park, NC. December 1981.

14. Watson, J.G., et al. Analysis of Inhalable and Fine Particulate Matter Measurements. Prepared for U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA–450/4–81–035. December 1981.

15. Record, F.A. and L.A. Baci. Evaluation on Contribution of Wind Blown Dust from the Desert Levels of Particulate Matter in Desert Communities. GCA Technology Division, Bedford, MA. Prepared for U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA–450/2–80–078. August 1980.

16. Goldstein, E.A. and Paly M. The Diesel Problem in New York City. Project on the Urban Environment. Natural Resources Defense Council, Inc., New York, NY. April 1985.

17. 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.

18. Pace, T., et al. Procedures for Estimating Probability of Nonattainment of a PM_{10} Data. U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA–450/4–86–017. December 1986.

[44 FR 27571, May 10, 1979; 44 FR 72592, Dec. 14, 1979, as amended at 46 FR 44168, Sept. 3, 1981; 51 FR 9597, Mar. 19, 1986; 52 FR 24742—23744, July 1, 1987; 52 FR 27286, July 20, 1987; 54 FR 15183, Apr. 17, 1989; 56 FR 64483, Dec. 10, 1991; 57 FR 44496, Sept. 28, 1992; 58 FR 8469, Feb. 12, 1993; 59 FR 41628, Aug. 12, 1994; 60 FR 11909, Mar. 3, 1995; 60 FR 52323, Oct. 6, 1995; 62 FR 6729, Feb. 13, 1997; 62 FR 18525, Apr. 16, 1997]

EFFECTIVE DATE NOTE: At at 60 FR 52323, October 6, 1995, appendix D to part 58 was amended in part by adding Section 2.2. This section contains information collection and recordkeeping requirements and will not become effective until approval has been given by the Office of Management and Budget.

APPENDIX E TO PART 58—PROBE AND MONITORING PATH SITING CRITERIA FOR AMBIENT AIR QUALITY MONITORING

1. Introduction
2 Sulfur Dioxide (SO_2), Ozone (O_3), and Nitrogen Dioxide (NO_2)
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2.3 Spacing From Obstructions
2.4 Spacing From Trees
2.5 Spacing From Roadways (Applicable to O_3 and NO_2 Only)
2.6 Cumulative Interferences on a Monitoring Path
2.7 Maximum Monitoring Path Length
3 [Reserved]
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4.2 Spacing From Obstructions
4.3 Spacing From Roadways
4.4 Spacing From Trees and Other Considerations
4.5 Cumulative Interferences on a Monitoring Path
4.6 Maximum Monitoring Path Length
5–6 [Reserved]
7. Lead(Pb)
7.1 Vertical Placement
7.2 Spacing From Obstructions
7.3 Spacing From Roadways

7.4 Spacing From Trees and Other Considerations.
8. Particulate Matter (PM_{10})
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8.3 Spacing From Roadways
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9. Probe Material and Pollutant Sample Residence Time
10. Photochemical Assessment Monitoring Stations (PAMS)
10.1 Horizontal and Vertical Placement
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10.3 Spacing From Roadways
10.4 Spacing From Trees
11. Discussion and Summary
12. Summary
13. References

1. *Introduction*

This appendix contains specific location criteria applicable to ambient air quality monitoring probes and monitoring paths after the general station siting has been selected based on the monitoring objectives and spatial scale of representation discussed in appendix D of this part. Adherence to these siting criteria is necessary to ensure the uniform collection of compatible and comparable air quality data.

The probe and monitoring path siting criteria discussed below must be followed to the maximum extent possible. It is recognized that there may be situations where some deviation from the siting criteria may be necessary. In any such case, the reasons must be thoroughly documented in a written request for a waiver that describes how and why the proposed siting deviates from the criteria. This documentation should help to avoid later questions about the validity of the resulting monitoring data. Conditions under which the EPA would consider an application for waiver from these siting criteria are discussed in section 11 of this appendix.

The spatial scales of representation used in this appendix, i.e., micro, middle, neighborhood, urban, and regional, are defined and discussed in appendix D of this part. 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. *Sulfur Dioxide (SO_2), Ozone (O_3), and Nitrogen Dioxide (NO_2)*

Open path analyzers may be used to measure SO_2, O_3, and NO_2 at SLAMS/NAMS sites for middle, neighborhood, urban, and regional scale measurement applications. Additional information on SO_2, NO_2, and O_3 monitor siting criteria may be found in references 11 and 13.

2.1 Horizontal and Vertical Placement. The probe or at least 80 percent of the monitoring path must be located between 3 and 15 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.

2.2 Spacing from Minor Sources (Applicable to SO_2 and O_3 Monitoring Only). Local minor sources of SO_2 can cause inappropriately high concentrations of SO_2 in the vicinity of probes and monitoring paths for SO_2. 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, particularly for open path analyzers because of their potential for greater exposure over the area covered by the monitoring path. 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. It is acceptable, however, to monitor for SO_2 near a point source of SO_2 when the objective is to assess the effect of this source on the represented population.

2.3 Spacing From Obstructions. Buildings and other obstacles may possibly scavenge SO_2, O_3, or NO_2. To avoid this interference, the probe or at least 90 percent of the monitoring path must have unrestricted airflow and be located away from obstacles so that the distance from the probe or monitoring path is at least twice the height that the obstacle protrudes above the probe or monitoring path. 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 must have unrestricted airflow in an arc of at least 270 degrees around the inlet probe, or 180 degrees if the probe is on the side of a building. This arc must include the predominant wind direction for the season of greatest pollutant concentration potential. A sampling station having a probe located closer to an obstacle than this criterion allows should be classified as middle scale rather than neighborhood or urban scale, since the measurements

from such a station would more closely represent the middle scale. 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.

Special consideration must be devoted to the use of open path analyzers due to their inherent potential sensitivity to certain types of interferences, or optical obstructions. While some of these potential interferences are comparable to those to which point monitors are subject, there are additional sources of potential interferences which are altogether different in character. Transient, but significant obscuration of especially longer measurement paths could be expected to occur as a result of certain prevailing 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.

In seeking EPA approval for inclusion of a site using an open path analyzer into the formal SLAMS/NAMS or PSD network, monitoring agencies must submit an analysis which evaluates both obscuration potential for a proposed path length for the subject area and the effect this potential is projected to have on the representativeness of the data record. This analysis should include one or more of the following elements, as appropriate for the specific circumstance: climatological information, historical pollutant and aerosol information, modeling analysis results, and any related special study results.

2.4 Spacing From Trees. Trees can provide surfaces for SO_2, O_3, or NO_2 adsorption or reactions and obstruct wind flow. To reduce this possible interference, the probe or at least 90 percent of the monitoring path should be 20 meters or more from the drip line of trees. If a tree or trees could be considered an obstacle, the probe or 90 percent of the monitoring path must meet the distance requirements of section 2.3 and be at least 10 meters from the drip line of the tree or trees. Since the scavenging effect of trees is greater for O_3 than for other criteria pollutants, strong consideration of this effect must be given to locating an O_3 probe or monitoring path to avoid this problem.

2.5 Spacing From Roadways (Applicable to O_3 and NO_2 Only). 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 1 provides the required minimum separation distances between a roadway and a probe and between a roadway and at least 90 percent of a monitoring path for various ranges of daily roadway traffic. A sampling station having a point analyzer probe located closer to a roadway than allowed by the table 1 requirements should be classified as middle scale rather than neighborhood or urban scale, since the measurements from such a station 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 1. The sum of these distances must not be greater than 10 percent of the total monitoring path length.

TABLE 1—MINIMUM SEPARATION DISTANCE BETWEEN ROADWAYS AND PROBES OR MONITORING PATHS FOR MONITORING NEIGHBORHOOD—AND URBAN—SCALE OZONE AND NITROGEN DIOXIDE

Roadway average daily traffic, vehicles per day	Minimum separation distance,[1] meters
≤10,000	10
15,000	20
20,000	30
40,000	50
70,000	100
≥110,000	250

[1] Distance from the edge of the nearest traffic lane. The distance for intermediate traffic counts should be interpolated from the table values based on the actual traffic count.

2.6 Cumulative Interferences on a Monitoring Path. The cumulative length or portion

of a monitoring path that is affected by minor sources, obstructions, trees, or roadways must not exceed 10 percent of the total monitoring path length.

2.7 Maximum Monitoring Path Length. 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 station meets the objectives and spatial scales defined for SLAMS in appendix D. Therefore, the Regional Administrator or the Regional Administrator's designee may require shorter path lengths, as needed on an individual basis, to ensure that the SLAMS meet the appendix D requirements. Likewise, the Administrator or the Administrator's designee may specify the maximum path length used at monitoring stations designated as NAMS or PAMS as needed on an individual basis.

3. [Reserved]

4. *Carbon Monoxide (CO)*

Open path analyzers may be used to measure CO at SLAMS/NAMS sites for middle or neighborhood scale measurement applications. Additional information on CO monitor siting criteria may be found in reference 12.

4.1 Horizontal and Vertical Placement. Because of the importance of measuring population exposure to CO concentrations, air should be sampled at average breathing heights. However, practical factors require that the inlet probe be higher. The required height of the inlet probe for CO monitoring is therefore 3±½ meters for a microscale site, which is a compromise between representative breathing height and prevention of vandalism. The recommended 1 meter range of heights is also a compromise to some extent. For consistency and comparability, it would be desirable to have all inlets at exactly the same height, but practical considerations often prevent this. Some reasonable range must be specified and 1 meter provides adequate leeway to meet most requirements.

For the middle and neighborhood scale stations, the vertical concentration gradients are not as great as for the microscale station. This is because the diffusion from roads is greater and the concentrations would represent larger areas than for the microscale. Therefore, the probe or at least 80 percent of the monitoring path must be located between 3 and 15 meters above ground level for middle and neighborhood scale stations. 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 both the prevailing wind direction during the season of highest concentration potential and the location of sources of interest, i.e., roadways.

4.2 Spacing From Obstructions. Buildings and other obstacles may restrict airflow around a probe or monitoring path. To avoid this interference, the probe or at least 90 percent of the monitoring path must have unrestricted airflow and be located away from obstacles so that the distance from the probe or monitoring path is at least twice the height that the obstacle protrudes above the probe or monitoring path. 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 must have unrestricted airflow in an arc of at least 270 degrees around the inlet probe, or 180 degrees if the probe is on the side of a building. This arc must include the predominant wind direction for the season of greatest pollutant concentration potential. 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.

Special consideration must be devoted to the use of open path analyzers due to their inherent potential sensitivity to certain types of interferences, or optical obstructions. While some of these potential interferences are comparable to those to which point monitors are subject, there are additional sources of potential interferences which are altogether different in character. Transient, but significant obscuration of especially longer measurement paths could be expected to occur as a result of certain prevailing 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.

In seeking EPA approval for inclusion of a site using an open path analyzer into the formal SLAMS/NAMS or PSD network, monitoring agencies must submit an analysis which evaluates both obscuration potential for a proposed path length for the subject area and the effect this potential is projected to have on the representativeness of the data record. This analysis should include one or more of the following elements, as appropriate for the specific circumstance: climatological information, historical pollutant and aerosol information, modeling analysis results, and any related special study results.

4.3 Spacing From Roadways. Street canyon and traffic corridor stations (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 stations, 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.

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. Also, the practical difficulty of positioning sampling inlets is less at midblock locations than at the intersection. However, the final siting of the monitor must meet the objectives and intent of appendix D, sections 2.4, 3, 3.3, and appendix E, section 4.

In determining the minimum separation between a neighborhood scale monitoring station and a specific line source, 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 2 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 station would closely represent the middle scale. Therefore, stations not meeting this criterion should be classified as middle scale.

TABLE 2—MINIMUM SEPARATION DISTANCE BETWEEN ROADWAYS AND PROBES OR MONITORING PATHS FOR MONITORING NEIGHBORHOOD SCALE CARBON MONOXIDE

Roadway average daily traffic, vehicles per day	Minimum separation distance [1] for probes or 90% of a monitoring path (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.

4.4 Spacing From Trees and Other Considerations. Since CO is relatively nonreactive, the major factor concerning trees is as obstructions to normal wind flow patterns. For middle and neighborhood scale stations, trees should not be located between the major sources of CO, usually vehicles on a heavily traveled road, and the monitor. The probe or at least 90 percent of the monitoring path must be 10 meters or more from the drip line of trees which are between the probe or the monitoring path and the road and which extend at least 5 meters above the probe or monitoring path. For microscale stations, no trees or shrubs should be located between the probe and the roadway.

4.5 Cumulative Interferences on a Monitoring Path. The cumulative length or portion of a monitoring path that is affected by obstructions, trees, or roadways must not exceed 10 percent of the total monitoring path length.

4.6 Maximum Monitoring Path Length. The monitoring path length must not exceed 1 kilometer for analyzers used for neighborhood scale monitoring applications, or 300 meters for middle scale monitoring applications. 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 station meets the objectives and spatial scales defined for SLAMS in appendix D. Therefore, the Regional Administrator or the Regional Administrator's designee may require shorter path lengths, as needed on an individual

basis, to ensure that the SLAMS meet the appendix D requirements. Likewise, the Administrator or the Administrator's designee may specify the maximum path length used at monitoring stations designated as NAMS or PAMS as needed on an individual basis.

5.–6. [Reserved]

7. *Lead (Pb)*

7.1 Vertical Placement. Several studies (*5, 14–15*) on the relationship between roadway placement of lead samplers and measured ambient concentrations do not typically indicate large gradients within the first 6 to 7 meters above ground level. Similar to monitoring for other pollutants, optimal placement of the sampler inlet for lead monitoring should be at breathing height level. However, practical factors such as prevention of vandalism, security, and safety precautions must also be considered when siting a lead monitor. Given these considerations, the sampler inlet for microscale lead monitors must be 2–7 meters above ground level. The lower limit was based on a compromise between ease of servicing the sampler and the desire to avoid unrepresentative conditions due to re-entrainment from dusty surfaces. The upper limit represents a compromise between the desire to have measurements which are most representative of population exposures and a consideration of the practical factors noted above.

For middle or larger spatial scales, increased diffusion results in vertical concentration gradients which are not as great as for the small scales. Thus, the required height of the air intake for middle or larger scales is 2–15 meters.

7.2 Spacing From Obstructions. The sampler must be located away from obstacles such as buildings, so that the distance between obstacles and the sampler is at least twice the height that the obstacle protrudes above the sampler.

A minimum of 2 meters of separation from walls, parapets, and penthouses is required for rooftop samplers. No furnace or incinerator flues should be nearby. The height and type of flues and the type, quality, and quantity of waste or fuel burned determine the separation distances. For example, if the emissions from the chimney have high lead content and there is a high probability that the plume would impact on the sampler during most of the sampling period, then other buildings/locations in the area that are free from the described sources should be chosen for the monitoring site.

There must be unrestricted airflow in an arc of at least 270° around the sampler.

Since the intent of the category (a) site is to measure the maximum concentrations from a road or point source, there must be no significant obstruction between a road or point source and the monitor, even though other spacing from obstruction criteria are met. The predominant direction for the season with the greatest pollutant concentration potential must be included in the 270° arc.

7.3 Spacing From Roadways. Numberous studies have shown that ambient lead levels near mobile source are a function of the traffic volume and are most pronounced at ADT ≥30,000 within the first 15 meters, on the downwind side of the roadways. (1, 16–19) Therefore, stations to measure the peak concentration from mobile sources should be located at the distance most likely to produce the highest concentrations. For the microscale station, the location must be between 5 and 15 meters from the major roadway. For the middle scale station, a range of acceptable distances from the major roadway is shown in table 4. This table also includes separation distances between a roadway and neighborhood or larger scale stations. These distances are based upon the data of reference 16 which illustrates that lead levels remain fairly constant after certain horizontal distances from the roadway. As depicted in the above reference, this distance is a function of the traffic volume.

TABLE 3—SEPARATION DISTANCE BETWEEN PB STATIONS AND ROADWAYS (EDGE OF NEAREST TRAFFIC LANE)

Roadway average daily traffic vehicles per day	Separation distance between roadways and stations, meters		
	Micro-scale	Middle scale	Neighborhood urban regional scale
≤10,000	5–15	[1]>15–50	[1]>50
20,000	5–15	>15–75	>75
≥40,000	5–15	>15–100	>100

[1] Distances should be interpolated based on traffic flow.

7.4. Spacing From Trees and Other Considerations. Trees can provide surfaces for deposition or adsorption of lead particles and obstruct normal wind flow patterns. For microscale and middle scale category (a) roadway sites there must not be any tree(s) between the source of the lead, i.e., the vehicles on the roadway, and the sampler. For neighborhood scale category (b) sites, the sampler should be at least 20 meters from the drip line of trees. The sampler must, however, be placed at least 10 meters from

the drip line of trees which could be classified as an obstruction, i.e., the distance between the tree(s) and the sampler is less than the height that the tree protrudes above the sampler.

8. *Particulate Matter (PM_{10})*

8.1 Vertical Placement. Although there are limited studies on the PM_{10} concentration gradients around roadways or other ground level sources, References 1, 2, 4, 18 and 19 of this appendix show a distinct variation in the distribution of TSP and Pb levels near roadways, TSP, which is greatly affected by gravity, has large concentration gradients, both horizontal and vertical, immediately adjacent to roads. Lead, being predominately sub-micron in size, behaves more like a gas and exhibits smaller vertical and horizontal gradients than TSP. PM_{10}, being intermediate in size between these two extremes exhibits dispersion properties of both gas and settleable particulates and does show vertical and horizontal gradients.[30] Similar to monitoring for other pollutants, optimal placement of the sampler inlet for PM_{10} monitoring should be at breathing height level. However, practical factors such as prevention of vandalism, security, and safety precautions must also be considered when siting a PM_{10} monitor. Given these considerations, the sampler inlet for microscale PM_{10} monitors must be 2–7 meters above ground level. The lower limit was based on a compromise between ease of servicing the sampler and the desire to avoid re-entrainment from dusty surfaces. The upper limit represents a compromise between the desire to have measurements which are most representative of population exposures and a consideration of the practical factors noted above.

For middle or larger spatial scales, increased diffusion results in vertical concentration gradients that are not as great as for the microscale. Thus, the required height of the air intake for middle or larger scales is 2–15 meters.

8.2 Spacing From Obstructions. If the sampler is located on a roof or other structure, then there must be a minimum of 2 meters separation from walls, parapets, penthouses, etc. No furnace or incineration flues should be nearby. This separation distance from flues is dependent on the height of the flues, type of waste or fuel burned, and quality of the fuel (ash content). In the case of emissions from a chimney resulting from natural gas combustion, as a precautionary measure, the sampler should be placed at least 5 meters from the chimney.

On the other hand, if fuel oil, coal, or solid waste is burned and the stack is sufficiently short so that the plume could reasonably be expected to impact on the sampler intake a significant part of the time, other buildings/locations in the area that are free from these types of sources should be considered for sampling. Trees provide surfaces for particulate desposition and also restrict airflow. Therefore, the sampler should be placed at least 20 meters from the dripline and must be 10 meters from the dripline when the tree(s) acts as an obstruction.

The sampler must also be located away from obstacles such as buildings, so that the distance between obstacles and the sampler is at least twice the height that the obstacle protrudes above the sampler except for street canyon sites. Sampling stations that are located closer to obstacles than this criterion allows should not be classified as neighborhood, urban, or regional scale, since the measurements from such a station would closely represent middle scale stations. Therefore, stations not meeting the criterion should be classified as middle scale.

There must be unrestricted airflow in an arc of at least 270° around the sampler except for street canyon sites. Since the intent of the category (a) site is to measure the maximum concentrations from a road or point source, there must be no significant obstruction between a road or point source and the monitor, even though other spacing from obstruction criteria are met. The predominant direction for the season with the greatest pollutant concentration potential must be included in the 270° arc.

8.3 Spacing From Roads. 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_{10} sampler siting.

The intent is to locate category (a) NAMS 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 station, 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 station, a range of acceptable distances from the roadway is shown in Figure 2. This figure also includes separation distances between a roadway and neighborhood or larger scale stations by default. Any station, 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 2, if a PM_{10} sampler is primarily influenced by roadway emissions and that sampler is set back 10 meters from a 30,000 ADT road, the station should be classified as a micro scale, if the

sampler height is between 2 and 7 meters. If the sampler height is between 7 and 15 meters, the station 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.

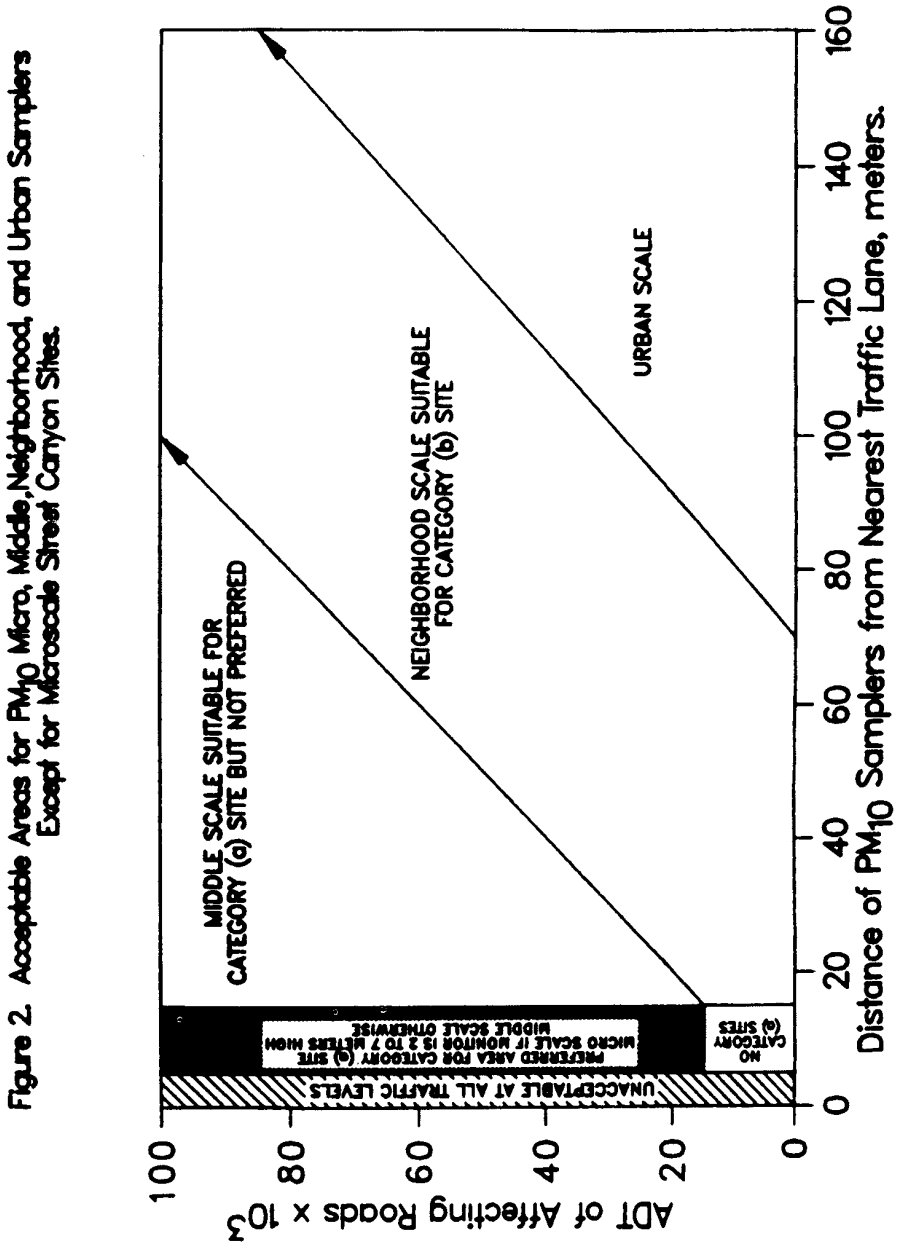

Figure 2. Acceptable Areas for PM_{10} Micro, Middle, Neighborhood, and Urban Samplers Except for Microscale Street Canyon Sites.

It is important to note that the separation distances shown in Figure 2 are measured from the edge of the nearest traffic lane of the roadway presumed to have the most influence on the site. In general, this presumption is an oversimplification of the usual urban settings which normally have several streets that impact a given site. The effects of surrounding streets, wind speed, wind direction and topography should be considered along with Figure 2 before a final decision is made on the most appropriate spatial scale assigned to the sampling station.

8.4 Other Considerations. For those areas that are primarily influenced by stationary source emissions as opposed to roadway emissions, guidance in locating these areas may be found in the guideline document Optimum Network Design and Site Exposure Criteria for Particulate Matter.[29]

Stations 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.

9. *Probe Material and Pollutant Sample Residence Time*

For the reactive gases, SO_2, NO_2, and O_3, special probe material must be used for point analyzers. Studies[20–24] have been conducted to determine the suitability of materials such as polypropylene, polyethylene, polyvinyl chloride, Tygon, aluminum, brass, stainless steel, copper, Pyrex glass and Teflon for use as intake sampling lines. Of the above materials, only Pyrex glass and Teflon have been found to be acceptable for use as intake sampling lines for all the reactive gaseous pollutants. Furthermore, the EPA[25] has specified borosilicate glass or FEP Teflon as the only acceptable probe materials for delivering test atmospheres in the determination of reference or equivalent methods. Therefore, borosilicate glass, FEP Teflon, or their equivalent must be used for existing and new NAMS or SLAMS.

For VOC monitoring at those SLAMS designated as 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 20 seconds or less.

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 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 SLAMS or NAMS must have a sample residence time less than 20 seconds.

10. *Photochemical Assessment Monitoring Stations (PAMS)*

10.1 Horizontal and Vertical Placement. The probe or at least 80 percent of the monitoring path must be located 3 to 15 meters above ground level. This range provides a practical compromise for finding suitable sites for the multipollutant PAMS. 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.

10.2 Spacing From Obstructions. The probe or at least 90 percent of the monitoring path must be located away from obstacles and buildings such that the distance between the obstacles and the probe or the monitoring path is at least twice the height that the obstacle protrudes above the probe or monitoring path. There must be unrestricted airflow in an arc of at least 270° around the probe inlet. Additionally, the predominant wind direction for the period of greatest pollutant concentration (as described for each site in section 4.2 of appendix D) must be included in the 270° arc. If the probe is located on the side of the building, 180° clearance is required. 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.

Special consideration must be devoted to the use of open path analyzers due to their inherent potential sensitivity to certain types of interferences, or optical obstructions. While some of these potential interferences are comparable to those to which point monitors are subject, there are additional sources of potential interferences which are altogether different in character. Transient, but significant obscuration of especially longer measurement paths could be expected to occur as a result of certain prevailing 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

[20–28] See References at end of this appendix.

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.

In seeking EPA approval for inclusion of a site using an open path analyzer into the formal SLAMS/NAMS or PSD network, monitoring agencies must submit an analysis which evaluates both obscuration potential for a proposed path length for the subject area and the effect this potential is projected to have on the representativeness of the data record. This analysis should include one or more of the following elements, as appropriate for the specific circumstance: climatological information, historical pollutant and aerosol information, modeling analysis results, and any related special study results.

10.3 Spacing From Roadways. It is important in the probe and monitoring path siting process to minimize destructive interferences from sources of NO since NO readily reacts with O_3. Table 4 below provides the required minimum separation distances between roadways and PAMS (excluding upper air measuring stations):

TABLE 4—SEPARATION DISTANCE BETWEEN PAMS AND ROADWAYS

[Edge of Nearest Traffic Lane]

Roadway average daily traffic, vehicles per day	Minimum separation distance between roadways and stations in meters [1]
<10,000	>10
15,000	20
20,000	30
40,000	50
70,000	100
>110,000	250

[1] Distance from the edge of the nearest traffic lane. The distance for intermediate traffic counts should be interpolated from the table based on the actual traffic flow.

10.4 Spacing From Trees. Trees can provide surfaces for adsorption and/or reactions to occur and can obstruct normal wind flow patterns. To minimize these effects at PAMS, the probe or at least 90 percent of the monitoring path should be placed at least 20 meters from the drip line of trees. Since the scavenging effect of trees is greater for O_3 than for the other criteria pollutants, strong consideration of this effect must be given in locating the PAMS probe or monitoring path to avoid this problem. Therefore, the probe or at least 90 percent of the monitoring path must be at least 10 meters from the drip line of trees.

11. *Waiver Provisions*

It is believed that most sampling probes or monitors can be located so that they meet the requirements of this appendix. New stations with rare exceptions, can be located within the limits of this appendix. However, some existing stations may not meet these requirements and yet still produce useful data for some purposes. EPA will consider a written request from the State Agency to waive one or more siting criteria for some monitoring stations providing that the State can adequately demonstrate the need (purpose) for monitoring or establishing a monitoring station at that location. For establishing a new station. a waiver may be granted only if both of the following criteria are met:

The site can be demonstrated to be as representative of the monitoring area as it would be if the siting criteria were being met.

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 station the necessary distance from roadways or obstructions).

However, for an existing station, a waiver may be granted if either of the above criteria are met.

Cost benefits, historical trends, and other factors may be used to add support to the above, however, they in themselves, will not be acceptable reasons for granting a waiver. Written requests for waivers must be submitted to the Regional Administrator. For those SLAMS also designated as NAMS, the request will be forwarded to the Administrator. For those SLAMS also designated as NAMS or PAMS, the request will be forwarded to the Administrator.

12. *Summary*

Table 5 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 5 that different elevation distances above the ground are shown for the various pollutants. The discussion in the text for each of the pollutants described 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 has been used. The upper limit of 15 meters was specified for consistency between pollutants and to allow the use of a single manifold or monitoring path for monitoring more than one pollutant.

TABLE 5—SUMMARY OF PROBE AND MONITORING PATH SITING CRITERIA

Pollutant	Scale [maximum monitoring path length, meters]	Height from ground to probe or 80% of monitoring path [A] (meters)	Horizontal and vertical distance from supporting structures [B] to probe or 90% of monitoring path [A] (meters)	Distance from trees to probe or 90% of monitoring path [A] (meters)	Distance from roadways to probe or monitoring path [A] (meters)
SO_2 [C,D,E,F]	Middle [300m] Neighborhood, Urban, and Regional [1km].	3–15	>1	>10	N/A.
CO [D,E,G]	Micro Middle [300m] Neighborhood [1km].	3±0.5; 3–15	>1	>10	2–10; See table 2 for middle and neighborhood scales.
O_3 [C,D,E]	Middle [300m] Neighborhood, Urban, and Regional [1km].	3–15	>1	>10	See table 1 for all scales.
Ozone precursors (for PAMS) [C,D,E].	Neighborhood and Urban. [1 km]	3–15	>1	>10	See table 4 for all scales.
NO_2 [C,D,E]	Middle [300m] Neighborhood and Urban [1km].	3–15	>1	>10	See table 1 for all scales.
Pb [C,D,E,F,H]	Micro; Middle, Neighborhood, Urban and Regional.	2–7 (Micro); 2–15 (All other scales).	>2 (All scales, horizontal distance only).	>10 (All scales)	5–15 (Micro); See table 3 for all other scales.
PM–10 [C,D,E,F,H]	Micro; Middle, Neighborhood, Urban and Regional.	2–7 (Micro); 2–15 (All other scales).	>2 (All scales, horizontal distance only).	>10 (All scales)	2–10 (Micro); See Figure 2 for all other scales.

N/A—Not applicable.

[A] 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.

[B] When probe is located on a rooftop, this separation distance is in reference to walls, parapets, or penthouses located on roof.

[C] 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.

[D] 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).

[E] Must have unrestricted airflow 270° around the probe or sampler; 180° if the probe is on the side of a building.

[F] 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.

[G] For microscale CO monitoring sites, the probe must be >10 meters from a street intersection and preferably at a midblock location.

[H] For collocated Pb and PM–10 samplers, a 2–4 meter separation distance between collocated samplers must be met.

13. *References*

1. Bryan, R.J., R.J. Gordon, and H. Menck. Comparison of High Volume Air Filter Samples at Varying Distances from Los Angeles Freeway. University of Southern California, School of Medicine, Los Angeles, CA. (Presented at 66th Annual Meeting of Air Pollution Control Association. Chicago, IL., June 24–28, 1973. APCA 73–158.)

2. Teer, E.H. Atmospheric Lead Concentration Above an Urban Street. Master of Science Thesis, Washington University, St. Louis, MO. January 1971.

3. Bradway, R.M., F.A. Record, and W.E. Belanger. Monitoring and Modeling of Resuspended Roadway Dust Near Urban Arterials. GCA Technology Division, Bedford, MA. (Presented at 1978 Annual Meeting of Transportation Research Board, Washington, DC. January 1978.)

4. Pace, T.G., W.P. Freas, and E.M. Afify. Quantification of Relationship Between Monitor Height and Measured Particulate Levels in Seven U.S. Urban Areas. U.S. Environmental Protection Agency, Research Triangle Park, NC. (Presented at 70th Annual Meeting of Air Pollution Control Association, Toronto, Canada, June 20–24, 1977. APCA 77–13.4.)

5. Harrison, P.R. Considerations for Siting Air Quality Monitors in Urban Areas. City of Chicago, Department of Environmental Control, Chicago, IL. (Presented at 66th Annual Meeting of Air Pollution Control Association, Chicago, IL., June 24–28, 1973. APCA 73–161.)

6. Study of Suspended Particulate Measurements at Varying Heights Above Ground.

Texas State Department of Health, Air Control Section, Austin, TX. 1970. p.7.

7. Rodes, C.E. and G.F. Evans. Summary of LACS Integrated Pollutant Data. In: Los Angeles Catalyst Study Symposium. U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA Publication No. EPA–600/4–77–034. June 1977.

8. Lynn, D.A. *et. al.* National Assessment of the Urban Particulate Problem: Volume 1, National Assessment. GCA Technology Division, Bedford, MA. U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA Publication No. EPA–450/3–75–024. June 1976.

9. Pace, T.G. Impact of Vehicle-Related Particulates on TSP Concentrations and Rationale for Siting Hi-Vols in the Vicinity of Roadways. OAQPS, U.S. Environmental Protection Agency, Research Triangle Park, NC. April 1978.

10. Ludwig, F.L., J.H. Kealoha, and E. Shelar. Selecting Sites for Monitoring Total Suspended Particulates. Stanford Research Institute, Menlo Park, CA. Prepared for U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA Publication No. EPA–450/3–77–018. June 1977, revised December 1977.

11. Ball, R.J. and G.E. Anderson. Optimum Site Exposure Criteria for SO_2 Monitoring. The Center for the Environment and Man, Inc., Hartford, CT. Prepared for U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA Publication No. EPA–450/3–77–013. April 1977.

12. Ludwig, F.L. and J.H.S. Kealoha. Selecting Sites for Carbon Monoxide Monitoring. Stanford Research Institute, Menlo Park, CA. Prepared for U.S. Environmental Protection Agency, Research Park, NC. EPA Publication No. EPA–450/3–75–077. September 1975.

13. Ludwig, F.L. and E. Shelar. Site Selection for the Monitoring of Photochemical Air Pollutants. Stanford Research Institute, Menlo Park, CA. Prepared for U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA Publication No. EPA–450/3–78–013. April 1978.

14. Lead Analysis for Kansas City and Cincinnati, PEDCo Environmental, Inc., Cincinnati, OH. Prepared for U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA Contract No. 66–02–2515, June 1977.

15. Barltrap, D. and C. D. Strelow. Westway Nursery Testing Project. Report to the Greater London Council. August 1976.

16. Daines, R. H., H. Moto, and D. M. Chilko. Atmospheric Lead: Its Relationship to Traffic Volume and Proximity to Highways. Environ. Sci. and Technol., 4:318, 1970.

17. Johnson, D. E., *et al.* Epidemiologic Study of the Effects of Automobile Traffic on Blood Lead Levels, Southwest Research Institute, Houston, TX. Prepared for U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA–600/1–78–055, August 1978.

18. Air Quality Criteria for Lead. Office of Research and Development, U.S. Environmental Protection Agency, Washington, DC EPA–600/8–77–017. December 1977.

19. Lyman, D. R. The Atmospheric Diffusion of Carbon Monoxide and Lead from an Expressway, Ph.D. Dissertation, University of Cincinnati, Cincinnati, OH. 1972.

20. Wechter, S.G. Preparation of Stable Pollutant Gas Standards Using Treated Aluminum Cylinders. ASTM STP. 598:40–54, 1976.

21. Wohlers, H.C., H. Newstein and D. Daunis. Carbon Monoxide and Sulfur Dioxide Adsorption On and Description From Glass, Plastic and Metal Tubings. J. Air Poll. Con. Assoc. 17:753, 1976.

22. Elfers, L.A. Field Operating Guide for Automated Air Monitoring Equipment. U.S. NTIS. p. 202, 249, 1971.

23. Hughes, E.E. Development of Standard Reference Material for Air Quality Measurement. ISA Transactions, 14:281–291, 1975.

24. Altshuller, A.D. and A.G. Wartburg. The Interaction of Ozone with Plastic and Metallic Materials in a Dynamic Flow System. Intern. Jour. Air and Water Poll., 4:70–78, 1961.

25. CFR Title 40 part 53.22, July 1976.

26. Butcher, S.S. and R.E. Ruff. Effect of Inlet Residence Time on Analysis of Atmospheric Nitrogen Oxides and Ozone, Anal. Chem., 43:1890, 1971.

27. Slowik, A.A. and E.B. Sansone. Diffusion Losses of Sulfur Dioxide in Sampling Manifolds. J. Air. Poll. Con. Assoc., 24:245, 1974.

28. Yamada, V.M. and R.J. Charlson. Proper Sizing of the Sampling Inlet Line for a Continuous Air Monitoring Station. Environ. Sci. and Technol., 3:483, 1969.

29. Koch, R.C. and H.E. Rector. Optimum Network Design and Site Exposure Criteria for Particulate Matter, GEOMET Technologies, Inc., Rockville, MD. Prepared for U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA Contract No. 68–02–3584. EPA 450/4–87–009. May 1987.

30. Burton, R.M. and J.C. Suggs. Philadelphia Roadway Study. Environmental Monitoring Systems Laboratory, U.S. Environmental Protection Agency, Research Triangle Park, N.C. EPA–600/4–84–070 September 1984.

31. Technical Assistance Document For Sampling and Analysis of Ozone Precursors. Atmospheric Research and Exposure Assessment Laboratory, U.S. Environmental Protection Agency, Research Triangle Park, NC 27711. EPA 600/8–91–215. October 1991.

32. Quality Assurance Handbook for Air Pollution Measurement Systems: Volume IV. Meteorological Measurements. Atmospheric

Research and Exposure Assessment Laboratory, U.S. Environmental Protection Agency, Research Triangle Park, NC 27711. EPA 600/4–90–0003. August 1989.

33. On-Site Meteorological Program Guidance for Regulatory Modeling Applications. Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, NC 27711. EPA 450/4–87–013. June 1987.

[44 FR 27571, May 10, 1979; 44 FR 72592, Dec. 14, 1979, as amended at 46 FR 44170, Sept. 3, 1981; 51 FR 9598, Mar. 19, 1986; 52 FR 24744—24748, July 1, 1987; 52 FR 27286, July 20, 1987; 58 FR 8474, 8475, Feb. 12, 1993; 60 FR 52324, Oct. 6, 1995]

APPENDIX F TO PART 58—ANNUAL SLAMS AIR QUALITY INFORMATION

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2.2.1 Site and Monitoring Information
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2.4.1 Site and Monitoring Information
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2.5.1 Site and Monitoring Information
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2.6 Lead (Pb)
2.6.1 Site and Monitoring Information
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2.7 Particulate Matter (PM_{10})
2.7.1 Site and Monitoring Information
2.7.2 Annual Summary Statistics
2.7.3 Episode and Other Unscheduled Sampling Data

1. *General*

This appendix describes information to be compiled and submitted annually to EPA for each ambient monitoring station in the SLAMS Network in accordance with §58.26. The annual summary statistics that are described in section 2 below shall be construed as only the minimum necessary statistics needed by EPA to overview national air quality status. They will be used by EPA to convey information to a variety of interested parties including environmental groups, Federal agencies, the Congress, and private citizens upon request. As the need arises, EPA may issue modifications to these minimum requirements to reflect changes in EPA policy concerning the National Ambient Air Quality Standards (NAAQS).

As indicated in §58.26(c), the contents of the SLAMS annual report shall be certified by the senior air pollution control officer in the State to be accurate to the best of his knowledge. In addition, the manner in which the data were collected must be certified to have conformed to the applicable quality assurance, air monitoring methodology, and probe siting criteria given in appendices A, C, and E to this part. A certified statement to this effect must be included with the annual report. As required by §58.26(a), the report must be submitted by July 1 of each year for data collected during the period January 1 to December 31 of the previous year.

EPA recognizes that most air pollution control agencies routinely publish air quality statistical summaries and interpretive reports. EPA encourages State and local agencies to continue publication of such reports and recommends that they be expanded, where appropriate, to include analysis of air quality trends, population exposure, and pollutant distributions. At their discretion, State and local agencies may wish to integrate the SLAMS report into routine agency publications.

2. *Required Information*

This paragraph describes air quality monitoring information and summary statistics which must be included in the SLAMS annual report. The required information is itemized below by pollutant. Throughout this appendix, the time of occurrence refers to the ending hour. For example, the ending hour of an 8-hour CO average from 12:01 a.m. to 8:00 a.m. would be 8:00 a.m.

For the purposes of range assignments the following rounding convention will be used. The air quality concentration should be rounded to the number of significant digits used in specifying the concentration intervals. The digit to the right of the last significant digit determines the rounding process. If this digit is greater than or equal to 5, the last significant digit is rounded up. The insignificant digits are truncated. For example, 100.5 ug/m^3 rounds to 101 ug/m^3 and 0.1245 ppm rounds to 0.12 ppm.

2.1 Sulfur Dioxide (SO_2)

2.1.1 Site and Monitoring Information. City name (when applicable), county name and street address of site location. AIRS-AQS site code. AIRS-AQS monitoring method code. Number of hourly observations. (*1*) Number of daily observations. (*2*)

2.1.2 Annual Summary Statistics. Annual arithmetic mean (ppm). Highest and second highest 24-hour averages (*3*) (ppm) and dates of occurrence. Highest and second highest 3-hour averages (*1, 3*) (ppm) and dates and times (*1*) (ending hour) of occurrence. Number of exceedances of the 24-hour primary NAAQS. (*3*) Number of exceedances of the 3-

hour secondary NAAQS. (*3*) Number of 24-hour average concentrations (*4*) in ranges:

Range	Number of values
0.00 to 0.04 (ppm)	
0.05 to 0.08	
0.09 to 0.12	
0.13 to 0.16	
0.17 to 0.20	
0.21 to 0.24	
0.25 to 0.28	
Greater than .28	

2.2 Total Suspended Particulates (TSP)

2.2.1 Site and Monitoring Information. City name (when applicable), county name and street address of site location. AIRS-AQS site code. Number of daily observations.

2.2.2 Annual Summary Statistics. Annual arithmetic mean ($\mu g/m^3$) as specified in appendix K of part 50. Daily TSP values exceeding the level of the 24-hour PM_{10} NAAQS and dates of occurrence. If more than 10 occurrences, list only the 10 highest daily values. Sampling schedule used such as once every six days, once every three days, etc. Number of additional sampling days beyond sampling schedule used. Number of 24-hour average concentrations in ranges:

Range	Number of values
0 to 50 ($\mu g/m^3$)	
51 to 100	
101 to 150	
151 to 200	
201 to 250	
251 to 300	
301 to 400	
Greater than 400	

2.2.3 Episode and Other Unscheduled Sampling Data. List episode measurements, other unscheduled sampling data, and dates of occurrence. List the regularly scheduled sample measurements and date of occurrence that preceded the episode or unscheduled measurement.

2.3 Carbon Monoxide (CO)

2.3.1 Site and Monitoring Information. City name (when applicable), county name and street address of site location. AIRS-AQS site code. AIRS-AQS monitoring method code. Number of hourly observations.

2.3.2 Annual Summary Statistics. Highest and second highest 1-hour values (ppm) and date and time of occurrence. Highest and second highest 8-hour averages (*3*) (ppm) and date and time of occurrence (ending hour). Number of exceedances of the 1-hour primary NAAQS. Number of exceedances of the 8-hour average primary NAAQS. (*3*) Number of 8-hour average concentrations (*4*) in ranges:

Range	Number of values
0 to 4 (ppm)	
5 to 8 (ppm)	
9 to 12	
13 to 16	
17 to 20	
21 to 24	
25 to 28	
Greater than 28	

2.4 Nitrogen Dioxide (NO_2)

2.4.1 Site and Monitoring Information. City name (when applicable), county name, and street address of site location. AIRS-AQS site code. AIRS-AQS monitoring method code. Number of hourly observations. (*1*) Number of daily observations. (*2*)

2.4.2 Annual Summary Statistics. Annual arithmetic mean (ppm). Highest and second highest hourly averages (*3*) (ppm) and their dates and time of occurrence. Highest and second highest 24-hour averages (*2*) and their date of occurrence (ppm). Number of hourly average concentrations in ranges. (*1*)

Range	Number of values
.0 to .04 (ppm)	
.05 to .08	
.09 to .12	
.13 to .16	
.17 to .20	
.21 to .24	
.25 to .28	
Greater than 0.28	

2.5 Ozone (O_3)

2.5.1 Site and Monitoring Information. City name (when applicable), county name and street address of site location. AIRS-AQS site code. AIRS-AQS monitoring method code. Number of hourly observations.

2.5.2 Annual Summary Statistics. Four highest daily maximum hour values (ppm) and their dates and time of occurrence. Number of exceedances of the daily maximum 1-hour primary NAAQS. Number of daily maximum hour concentrations in ranges:

Range	Number of values
0 to .04 (ppm)	
.05 to .08	
.09 to .12	
.13 to .16	
.17 to .20	
.21 to .24	
.25 to .28	
Greater than .28	

2.6 Lead (Pb).

2.6.1 Site and Monitoring Information. City name (when applicable), county name, and street address of site location, AIRS-AQS site code. AIRS-AQS monitoring method code. Sampling interval of submitted data, e.g., twenty-four hour or quarterly composites.

2.6.2 Annual Summary Statistics. The four quarterly arithmetic averages given to two decimal places for the year together with the

number of twenty-four hour samples included in the average, as in the following format:

Quarter	Number of 24-hour samples	Quarterly arithmetic average (μg/m³)
Jan.–March		
April–June		
July–Sept		
Oct.–Dec		

2.7 Particulate Matter (PM_{10})

2.7.1 Site and Monitoring Information. City name (when applicable), county name, and street address of site location. AIRS-AQS site code. Number of daily observations.

2.7.2 Annual Summary Statistics. Annual arithmetic mean (μg/m³) as specified in appendix K of part 50. All daily PM_{10} values above the level of the 24-hour PM_{10} NAAQS and dates of occurrence. Sampling schedule used such as once every six days, once every three days, etc. Number of additional sampling days beyond sampling schedule used. Number of 24-hour average concentrations in ranges:

Range	Number of values
0 to 25 (μg/m³)	
26 to 50	
51 to 75	
76 to 100	
101 to 125	
126 to 150	
151 to 175	
176 to 200	
Greater than 200	

2.7.3 Episode and Other Unscheduled Sampling Data. List episode measurements, other unscheduled sampling data, and dates of occurrence. List the regularly scheduled sample measurements and date of occurrence that preceded the episode or unscheduled measurement.

Footnotes

1. Continuous methods only.

2. Manual or intermittent methods only.

3. Based on nonoverlapping values computed according to procedures described in reference (1) or on individual intermittent measurements.

4. Based on overlapping running averages for continuous measurements as described in reference (1) or on individual measurement for intermittent methods.

Reference

1. ''Guidelines for the Interpretation of Air Quality Standards'' U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC 27711. OAQPS No. 1.2–008, February, 1977.

[44 FR 27571, May 10, 1979, as amended at 46 FR 44171, Sept. 3, 1981; 51 FR 9600, Mar. 19, 1986; 52 FR 24748, 24749, July 1, 1987; 59 FR 41628, Aug. 12, 1994]

APPENDIX G TO PART 58—UNIFORM AIR QUALITY INDEX AND DAILY REPORTING

1. General
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6. Prominent public notice
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1. *General*

This appendix describes the uniform air quality index to be used by States in reporting the daily air quality index required by §58.40.

2. *Definitions*

a. The uniform air quality required for the daily reporting of air quality is a modified form of the Pollutant Standards Index (PSI).

b. *Reporting agency* means the applicable State agency or, in metropolitan areas, a local air pollution control agency designated by the State to carry out the provisions of §58.40.

c. *Reporting area* means the geographical area for which the daily index is representative for the reporting period. This area(s) may be the total urban area (or subpart thereof) or each of any number of distinct geographical subregions of the urban area deemed necessary by the reporting agency for adequate presentation of local air quality conditions.

d. *Reporting day* means the calendar day during which the daily report is given.

e. *Reporting period* means the time interval for which the daily report is representative. Normally, the reporting period is the 24-hour period immediately preceding the time of the report and should coincide to the extent practicable with the reporting day. In cases where the index will be forecasted the reporting period will include portions of the reporting day for which no monitoring data are available at the time of the report.

f. *Critical pollutant* means the pollutant with the highest subindex during the reporting period.

g. *Subindex* means the calculated index value for a single pollutant as described in section 7.

3. *Monitoring Data*

The monitoring data used to prepare the daily index report must be based on data obtained from the SLAMS network (or portions thereof) required under 40 CFR 58.20. Air quality measurements need not be made on reporting days for which the agency does not ordinarily schedule monitoring to occur. For example, PM_{10} measurements are to be included in the index calculations on days for which data are required (minimum of one sample per 6 days), but may be excluded on other days. PM_{10} measurements from samplers other than the reference or equivalent method sampler, may be included in index calculations provided such measurements can be quantitatively related to reference or equivalent method measurements.

Data used to calculate the daily index (and respective subindices) should come from the most recent sampling period. The index should be based on data obtained during the 24-hour period for which the index is reported. No monitoring data are to be used for index calculations for which the end of the sampling period precedes the reporting day by more than 24-hours. To the extent practicable, agencies should forecast the index using whatever procedures are most accurate and reasonable through consideration of local meteorological and topographical conditions and the availability of data and forecasting expertise.

4. *Geographic Applicability*

Generally, the area contained within the geographic boundaries of the urban area is sufficient for purposes of calculating and reporting the index. The exception occurs in cases where a significant air quality problem exists (PSI greater than 100) in highly populated areas adjacent to, but outside of, the urban area. For example, ozone concentrations are often highest downwind and outside the urban area.

Agencies should report a separate air quality index for each subregion of the urban area which is likely to have air quality significantly different from other portions of the urban area if such data are readily available. At a minimum, the subregion subject to the highest index values shall be included in the index computation. This subregion shall be selected by the reporting agency after past air quality has been reviewed to determine which monitoring stations typically record the highest pollutant concentrations.

5. *Daily Index Report*

The daily index report must be based on the uniform air quality index described in section 7 and contain the following information: (1) The reporting area(s); (2) the reporting period; (3) the critical pollutant; (4) the subindex corresponding to the critical pollutant; and (5) the descriptor word according to the following system:

Index Range and Descriptor Category

0 to 50 ..... ''Good''
51 to 100 ..... ''Moderate''
101 to 199 ..... ''Unhealthful''
200 to 299 ..... ''Very Unhealthful''
300 and above ..... ''Hazardous''

Reporting agencies should, at their discretion, report additional information such as the following: (1) Pollutants other than the critical pollutants and their individual subindices; (2) subindices and respective pollutant names for each of a number of distinct reporting areas within the urban area; (3) actual pollutant concentration values; and (4) causes for unusual PSI readings, such as high background air quality levels and other natural phenomena.

6. *Prominent Public Notice*

The reporting agency shall make prominent public notice of the daily index report on at least 5 days per week. Prominent public notification consists of at a minimum: (1) Furnishing the daily report to one or more of the appropriate news media (radio, television, newspapers); and (2) making the daily index report publicly available at one or more places of public access. Index reports also may be disseminated by means of recorded messages.

7. *Uniform Air Quality Index*

The uniform index is based on the pollutants standards index (PSI) structure (see section 10), which includes the five pollutants for which primary National Ambient Air Quality Standards (NAAQS) have been established. These pollutants are: Particulate matter (PM_{10}), sulfur dioxide (SO_2), carbon monoxide (CO), ozone (O_3) and nitrogen dioxide (NO_2). For each pollutant, a subindex is calculated from a segmented linear function that transforms ambient concentrations onto a scale extending from 0 through 500, with 100 corresponding to the primary NAAQS concentrations and 500 corresponding to the significant harm levels established in §51.16 of this chapter. In order to achieve relative uniformity for intermediate PSI values of 200, 300, and 400 among the several pollutants, their effects were approximately normalized by using the breakpoints corresponding to the Alert, Warning and Emergency levels in the example episode criteria. (1) However, because many factors, including meteorological conditions, are taken into account before triggering episode control actions, the reported PSI values and the calling of an episode do not always correspond. It should be recognized that over time with new information on effects, the actual concentrations corresponding to the PSI values may change. The PSI values themselves and their health implications, however, should remain the same. Similarly, concentrations and conditions leading to administrative episode actions may change.

The breakpoint used in defining each of the five pollutant subindices are listed in gravimetric units (Table 1) and in volumetric units (Table 2). The individual computational scheme is defined below for calculating the pollutant subindex values.

7.1 Uniform Index Computation. Each subindex i, is calculated by using a segmented linear function (Figures 1–6) that relates pollutant concentration, X_i, to subindex value, I_i. A segmented linear function consists of straight-line segments joining discrete coordinates (i.e., breakpoints). For pollutant i and segment j, the coordinates of the jth breakpoint are represented by subindex value $I_{i,j}$ and concentration $X_{i,j}$ giving the ordered pair ($X_{i,j}$ $I_{i,j}$). If the observed concentration is X_i, the corresponding subindex value I_i is calculated using the following equation over the concentration range:

$$X_{i,j} \le X_i \le X_{i,j+1}:$$

$$I_i = \frac{I_{i,j+1} - I_{i,j}}{X_{i,j+1} - X_{i,j}}\left(X_i - X_{i,j}\right) + I_{i,j} \qquad (1)$$

$$\text{for } X_{i,j} \le X_i \le X_{i,j+1}$$

where X_i = observed concentration for ith pollutant

$I_{i,j}$ = PSI value for ith pollutant and jth breakpoint (Table 1 or 2)

$I_{i,j+1}$ = PSI value for ith pollutant and (j + 1)th breakpoint (Table 1 or 2)

$X_{i,j}$ = concentration for ith pollutant and jth breakpoint (Table 1 or 2)

$X_{i,j+1}$ = concentration for ith pollutant and (j + 1)th breakpoint (Table 1 or 2)

Finally, the overall index is calculated as the maximum of subindices:

$$PSI = \max(I_1, I_2, \ldots, I_i, \ldots I_n)$$

n = number of pollutants (including pollutant combinations)

7.2 *Example Computation.* Suppose a PM_{10} 24-hour concentration of 283 μg/m³ is observed. The PM_{10} subindex is calculated using equation 1 as follows: In table 1, the observed concentration of X_i=283 μg/m³ lies between 150 and 350 μg/m³, therefore this computation is carried out for the second segment (j=2). For this segment, $X_{1,2}$=150 and $X_{1,3}$=350, with corresponding subindex values for $I_{1,2}$=100 and $I_{1,3}$=200. The computation is as follows:

where

I_i = subindex for ith pollutant

$$L_i = \frac{I_{1,3} - I_{1,2}}{X_{1,3} - X_{1,2}}\left(283 - X_{1,2}\right) + I_1 = \frac{200-100}{350-150}(283-150) + 100 = \frac{100}{200} \times 133 + 100 = 167$$

Therefore, the PM_{10} subindex is I=167. If four other pollutant subindices calculated in a similar manner from observations on the same data were: I_2=0, I_3=0, I_4=20, and I_5=30, then the overall index is reported as the maximum of these values:

PSI=max(167,0,0,20,30)=167

A typical report might contain the following statement: ''Today's air quality index is 161 which is regarded as unhealthful. The responsible pollutant is particulate matter. This report represents conditions prevailing over most of the downtown urban area for the previous 24-hour period ending at noon today.'' If the index were forecast for the next day, the following additional language might also be used: ''The current forecast is for improved air quality tomorrow with the index not expected to exceed 80.''

8. *Exceptions*

In many urban areas, a given air pollutant may exhibit low concentrations repetitively. At the discretion of the reporting agency, pollutants for which PSI values are consistently below 50 for an extended period (for example, a season or year) may be excluded in calculations of the daily index. Also, in situations where the PSI value has not exceeded 50, as calculated by the critical pollutant, for the previous calendar year, the requirement to measure and report the PSI will be left up to the discretion of the reporting agency.

Because the index is for the purpose of achieving national uniformity of daily air quality reports, the following variations are not permitted unless approved by the EPA Administrator:

a. Exlusion of pollutants described in section 7 from index calculations except as permitted above.

b. Incorporation of pollutants and/or pollutant combinations into the index not described in section 7.

c. Use of breakpoints other than those given in table 1 or 2.

d. Use of descriptor words other than those given in section 5.

9. *Reporting Agency Recordkeeping.*

The reporting agency shall keep annual records of the frequency with which reporting index values occur in each of the index descriptor categories. These records must also indicate the pollutant monitors in the

SLAMS network being used for purposes of calculating the index for each reporting area. Such records must be made available for inspection at the request of the Administrator.

10. *Basis for PSI*

The development and evaluation of the PSI index structure have been documented extensively. (2–12) The index was created as a result of a joint EPA/CEQ study (2) which identified problems resulting from the diversity of indices used in the United States and Canada. This report proposed design principles that could be used to develop a nationally uniform index to meet the needs of State and local agencies. The design principles on which PSI is based, along with previous versions of the index, have been presented in various scientific reports, (3, 4) articles in technical journals, (4, 5, 11) and at various scientific meetings and conferences. (7–10) Most recently, the history of the development of PSI along with its scientific rationale, has been summarized in a book. (6) In September 1976, PSI was published in the FEDERAL REGISTER (13) for use by State and local air pollution control agencies on a voluntary basis.

11. *Additional Information*

A variety of computational techniques have been developed to assist the user in calculating PSI in an accurate, convenient and rapid manner. (6) The primary techniques available are graphs (linear and logarithmic), nomograms, tables, and computer approaches. An EPA report (14) describes each technique, lists its advantages and disadvantages, includes examples of the methods, and provides nomograms and tables in both gravimetric and volumetric units. The nomograms are considered to be the most efficient way of competing the index and should be of greatest assistance to State and local agencies. Computer approaches for calculating PSI also are available. (15) These approaches lend themselves to applications with programmable hand calculators, minicomputers, or large-scale digital computers. A general computer program, Index Plot, used in an earlier evaluation of PSI, (11) is available from EPA and is fully documented. (15) This computer program is useful for analyzing air quality data by means of PSI over relatively long periods (a month, a season, or a year). It plots the time series of daily index values on the line printer, generates and plots a histogram and cumulative frequencies of PSI values, computes summary data by subindex and descriptor category, computes overall statistics for PSI, and inventories all missing values in the data set. Agencies can use this program to translate all historical data collected at any station into the corresponding PSI values, and, thus, retain for recordkeeping purposes a uniform retrospective record of air quality. (11, 15) Requests for these reports should be addressed to the Environmental Protection Agency, Library, MD–35, Research Triangle Park, NC 27711.

Additional information on descriptive language to report with the index is provided in an earlier report (1) and in the air quality criteria documents published for each air pollutant. (16–20) Additional information on meteorological forecasting services from the National Weather Service also is available in the literature. (21, 22)

Additional information on the health effects of each air pollutant used in PSI is available in a brochure entitled, ''Measuring Air Quality: The New Pollutant Standards Index,'' Printing Management Office (PM–215), U.S. Environmental Protection Agency, 401 M Street, SW., Washington, DC 20460.

12. *References*

1. ''Guideline for Public Reporting of Daily Air Quality-Pollutant Standards Index (PSI), '' U.S. Environmental Protection Agency Office of Air Quality Planning and Standards, Research Triangle Park, NC OAQPS No. 1.2–044, August 1976.

2. Thom, Gary C., and Wayne R. Ott., *Air Pollution Indices: A Compendium and Assessment of Indices Used in the United States and Canada,* joint study supported by the Council on Environmental Quality and the U.S. Environmental Protection Agency, December 1975, and reprinted by Ann Arbor Science Publishers, Ann Arbor, MI, 1976.

3. ''A Recommended Air Pollution Index,'' report prepared by the Federal Interagency Task Force on Air Quality Indicators, Council on Environmental Quality, Environmental Protection Agency, and Department of Commerce, September 1976.

4. Thom, Gary C., and Wayne R. Ott., ''A Proposed Uniform Air Pollution Index,'' *Atmos Environ* 10:261 (1976).

5. Ott, Wayne R., and Gary C. Thom, ''A Critical Review of Air Pollution Index Systems in the United States and Canada,'' *J. Air Pollution Control Association* 26:460 (1976).

6. Ott, Wayne R., *Environmental Indices,* Ann Arbor Science Publishers, Ann Arbor, MI, 1978.

7. Hunt, William F., William M. Cox, Wayne R. Ott, and Gary C. Thom. ''A Common Air Quality Reporting Format: Precursor to an Air Quality Index,'' *Proceedings of the Fifth Annual Environmental Engineering and Science Conference, Louisville, KY,* March 3–4, 1975, pp. 101–121.

8. Ott, Wayne R., and Gary C. Thom, ''Air Pollution Indices in the United States and Canada—the Present Picture,'' presented at the 171st National Meeting of the American Chemical Society, New York, NY, April 7, 1976.

9. Thom, Gary C., Wayne R. Ott, William F. Hunt, and John B. Moran ''A Recommended Standard Air Pollution Index,'' presented at

the 171st National Meeting of the American Chemical Society, New York, NY, April 7, 1976.

10. Hunt, William F., Raymond Smith, Wayne R. Ott, and Wilson B. Riggan, ''The Pollutant Standards Index (PSI)—An Early Warning System for Air Pollution,'' presented at the 8th International Scientific Meeting of the International Epidemiological Association, Las Croabas, PR, September 18–23, 1977.

11. Ott, Wayne R., and William F. Hunt, ''A Quantitative Evaluation of the Daily Air Pollution Index Proposed by the U.S. Environmental Protection Agency,'' *J. Air Pollution Control Association* 26:1050 (1976).

12. Hunt, William F., and Wayne R. Ott, Pollutant Standards Index (PSI) Evaluation Study, Joint Office of Air and Waste Management and Research and Development Report, U.S. Environmental Protection Agency, Research Triangle Park, NC, April 1976.

13. FEDERAL REGISTER, Vol. 41, September 7, 1976, pp. 37660–37671.

14. Wallace, Lance A., and Wayne R. Ott, ''Rapid Techniques for Calculating the Pollutant Standards Index (PSI),'' U.S. Environmental Protection Agency, Washington, DC Report No. EPA–600/4–78–002, March 1978.

15. Ott, Wayne R., ''A FORTRAN Program for Computing the Pollutant Standards Index (PSI),'' U.S. Environmental Protection Agency, Washington, DC, Report No. EPA–600/4–78–001, May 1978.

16. ''Air Quality Criteria for Particulate Matter,'' USDEHEW, PHS, CPEHS, NAPCA, Washington, DC, January 1969, No. AP–49.

17. ''Air Quality Criteria for Sulfur Oxides,'' USDHEW, PHS, CPEHS, NAPCA, Washington, DC, January 1969, No. AP–50.

18. ''Air Quality Criteria for Carbon Monoxide,'' USDHEW, PHS, CPEHS, Washington, DC, March 1970, No. AP–42.

19. ''Air Quality Criteria for Photochemical Oxidants,'' USDHEW, PHS, CPEHS, Washington, DC, March 1970, No. AP–63.

20. ''Air Quality Criteria for Nitrogen Dioxide,'' EPA, APCO, Washington, DC, January 1971, No. AP–84.

21. *National Weather Service Operations Manual Air Pollution Weather Forecasts*, WSOM Issuance 75–13, Part C. Chapter 30, April 1975.

22. *National Weather Service Technical Procedures Bulletin* No. 122: ''Air Stagnation Guidance for Facsimile and Teletype (3rd Edition),'' October 21, 1974. (supercedes previous TPB's Nos. 52, 58 and 69).

TABLE 1—BREAKPOINTS FOR PSI IN METRIC UNITS [1]

PSI value (ψ)	24-hr. PM μg/m³	24-hr. SO_2 μg/m³	8-hr. CO mg/m³	1-hr. 0_3 μg/m³	1-hr. NO_2 μg/m³
50	50	80	5	120	(2)
100	150	365	10	235	(2)
200	350	800	17	400	1,130
300	420	1,600	34	800	2,260
400	500	2,100	46	1,000	3,000
500	600	2,620	57.5	1,200	3,750

[1] At 25 °C and 760 mm Hg.
[2] No index value reported at these concentration levels because there is no short-term NAAQS.

TABLE 2—BREAKPOINTS FOR PSI

[Parts per million]

PSI value (ψ)	24-hr. SO_2	8-hr. CO	1-hr. O_3	1-hr. NO_2
50	0.03	4.5	.06	(1)
100	0.14	9	.12	(1)
200	0.30	15	0.2	0.6
300	0.60	30	0.4	1.2
400	0.80	40	0.5	1.6
500	1.00	50	0.6	2.0

[1] No index value reported at these concentration levels because there is no short-term NAAQS.

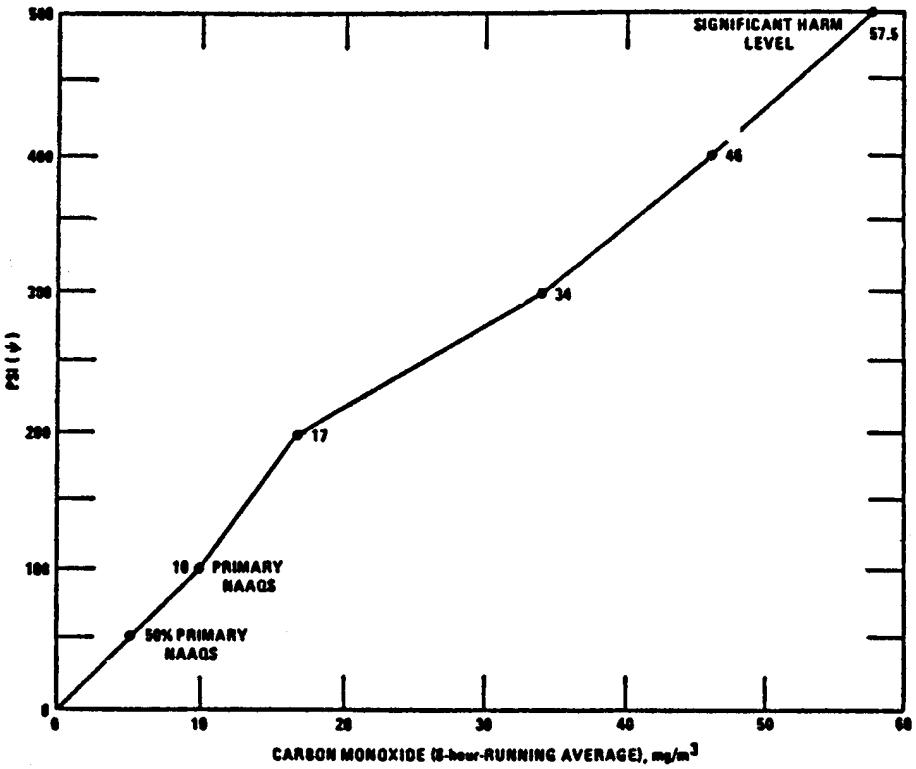

Figure 1. PSI function for carbon monoxide.

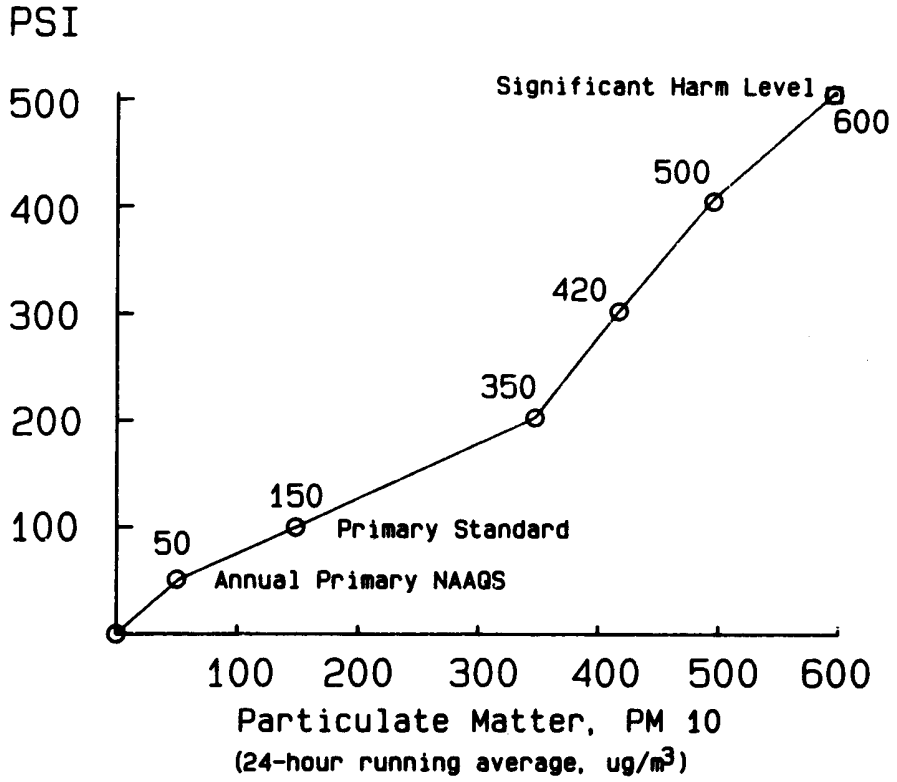

Figure 2. PSI Function for Suspended Particulate Matter, PM 10

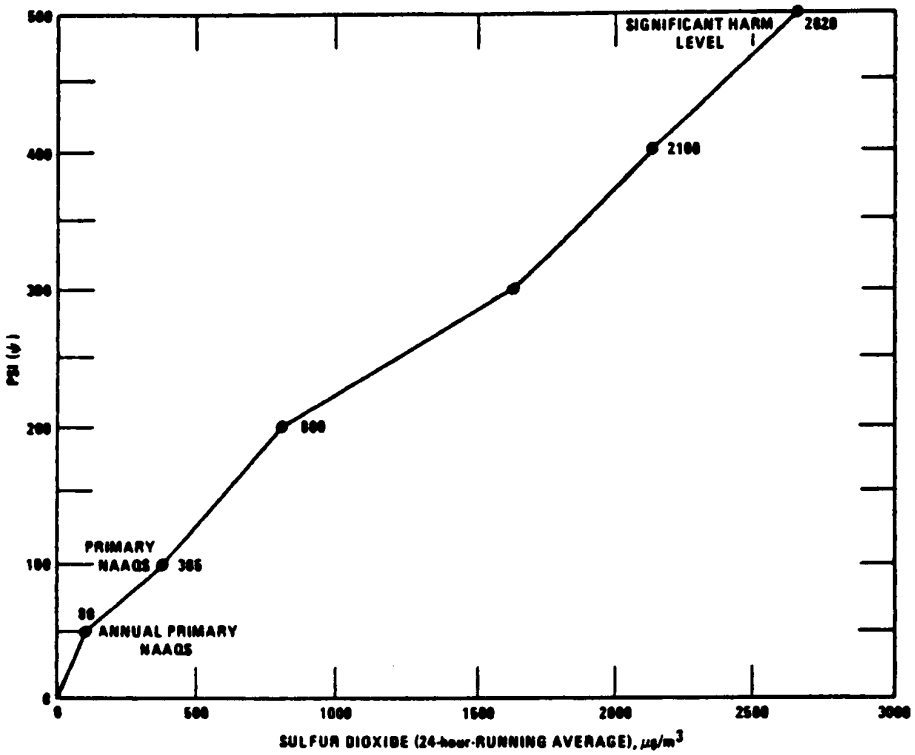

Figure 3. PSI function for sulfur dioxide.

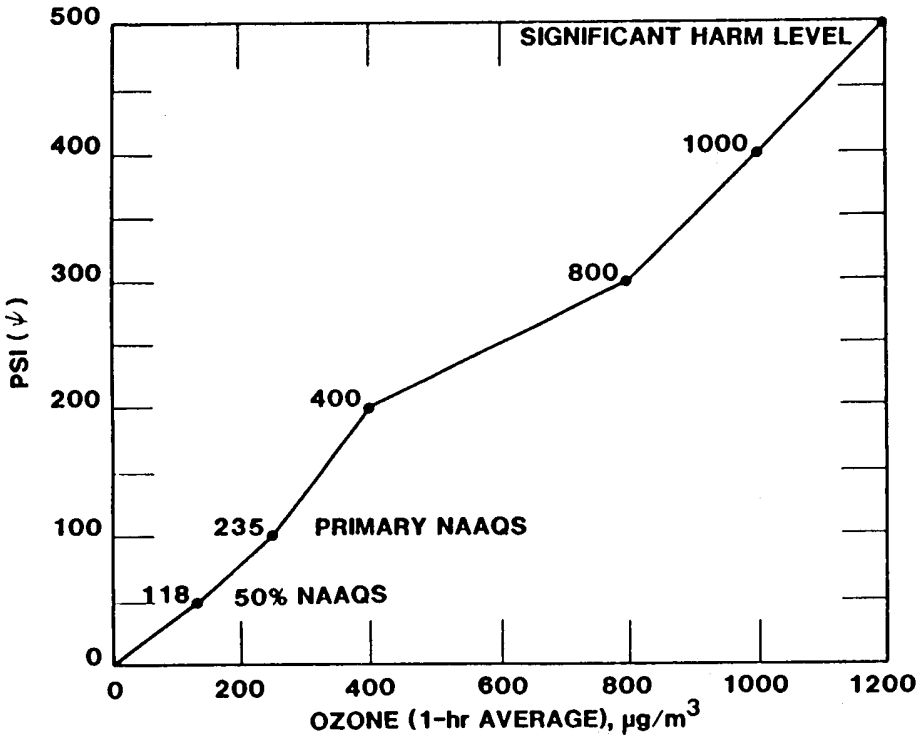

Figure 4. PSI function for ozone.

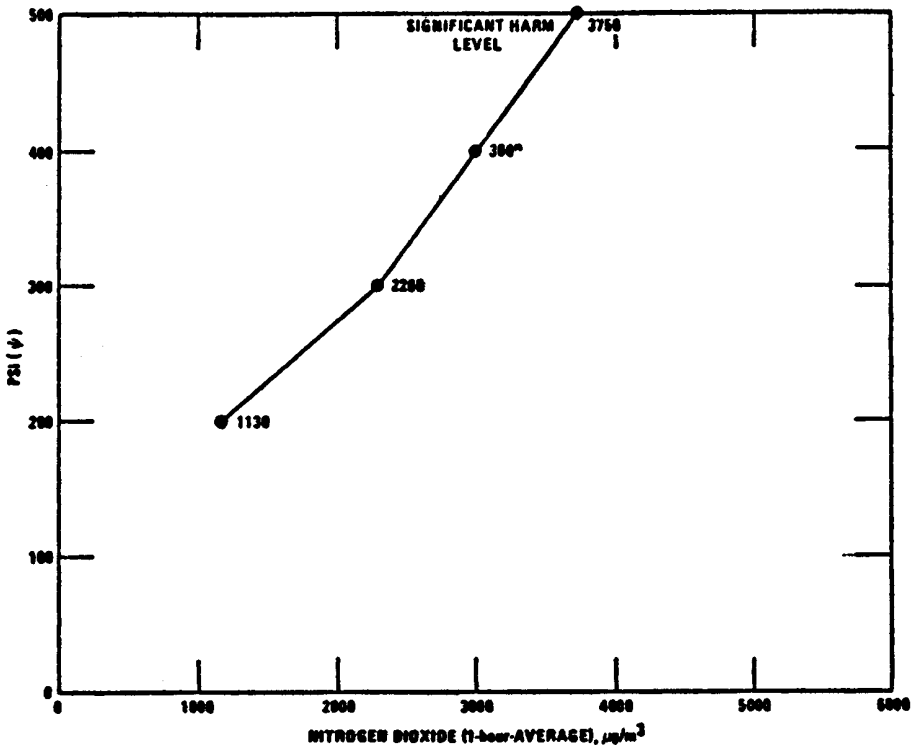

Figure 5. PSI function for nitrogen dioxide.

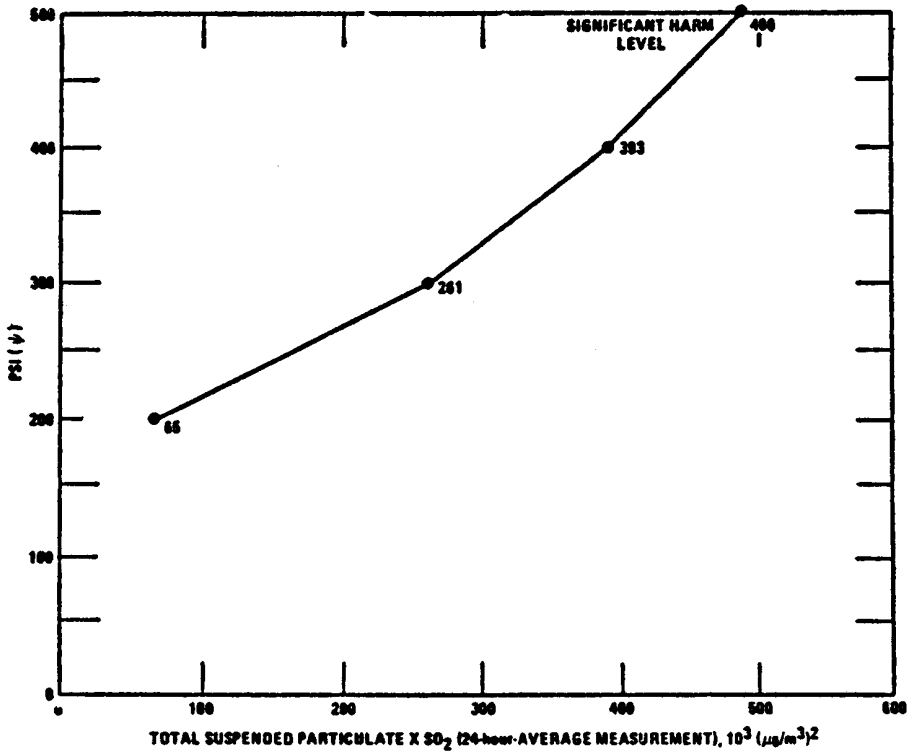

Figure 6. PSI function for product of total suspended particulate and sulfur dioxide.

[44 FR 27571, May 10, 1979; 44 FR 65070, Nov. 9, 1979; 44 FR 72592, Dec. 14, 1979, as amended at 51 FR 9600, Mar. 19, 1986; 52 FR 24749, 24750, July 1, 1987; 59 FR 41628, Aug. 12, 1994]

PART 59—[RESERVED]