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ENVIRONMENTAL PROTECTION AGENCY

■

AMBIENT AIR QUALITY STANDARDS

**Reference Method for
Determination of
Nitrogen Dioxide**

Transportation Control Measures

ENVIRONMENTAL PROTECTION AGENCY

[40 CFR Part 50]

NATIONAL PRIMARY AND SECONDARY AMBIENT AIR QUALITY STANDARDS

Reference Method for Determination of Nitrogen Dioxide

On April 30, 1971 (36 FR 8186), the Administrator of the Environmental Protection Agency (EPA) promulgated, as 42 CFR, part 410, national primary and secondary ambient air quality standards for six pollutants, including nitrogen dioxide. These regulations were recodified on November 25, 1971 (37 FR 22384), as 40 CFR, part 50. In addition to the national standards, the Administrator designated reference methods for the measurement of ambient air concentrations of each pollutant. The reference method for nitrogen dioxide is set forth in appendix F to 40 CFR, part 50.

On June 14, 1972 (37 FR 11826), the Administrator stated that the reference method for measuring nitrogen dioxide (NO₂) was suspected of being unreliable; results of laboratory testing and air quality measurements made over a period of several months at a large number of locations identified apparent deficiencies with the reference method. Accordingly, the Administrator announced that the reference method would be reevaluated.

The main investigations leading to the conclusion that reference method may have some inherent problems were conducted by the Office of Measurement Standardization (OMS) and the Laboratory Measurements Research Section (LMRS) of the Division of Chemistry and Physics and in the Air Quality Analytical Laboratory (AQAL) of the Division of Atmospheric Surveillance. Nitrogen dioxide generation-dilution systems based on an NO₂ permeation tube were used during all investigations. Nitrogen dioxide-air mixtures of varying concentrations were generated by the OMS and the mixtures were sampled and analyzed by the reference method for NO₂. The collection efficiency of the reference method was then determined by comparing the amount of NO₂ found after analyses versus the known amount of NO₂ generated and introduced into the sampling train. Before insertion of the permeation device into the NO₂ generation-dilution apparatus, dynamic blanks were run, and it was found that blank corrections were negligible.

For each test atmosphere generated, at least five simultaneous samples were collected and analyzed. Hence, the data points in figure 1 are averages \geq five determinations. Additionally, four different permeation devices were used during the study. The results shown in figure 1 demonstrate that the collection efficiency of the reference method varies nonlinearly with NO₂ concentrations from 15 percent at 740 $\mu\text{g}/\text{m}^3$ to 50-70 percent at the 20-50 $\mu\text{g}/\text{m}^3$. These data agree reasonably with the limited permeation tube data published in the reference method and by Purdue et al. (Env. Sci. and Tech.,

6, 152, 1972.) This method of calibration differs from that published for the reference method in that NO₂ gas rather than nitrite ion is dynamically carried through the reference procedure. This, in turn,

reflects the advancement in the state of art and use of the NO₂ permeation device as a calibration standard which afforded the opportunity to study the NO₂ analytical problem in much more depth.

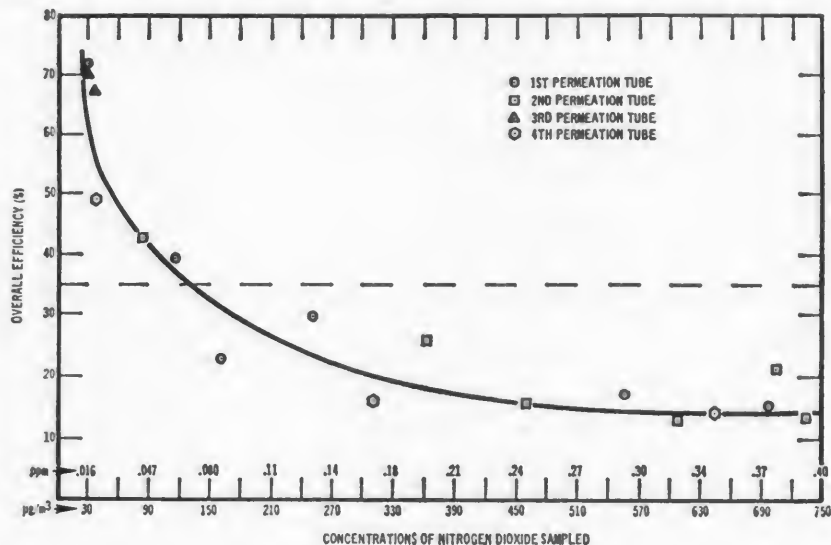


Figure 1. Response To The NO₂ Reference Method

The second problem recently found in reference method is a positive interference caused by the presence of nitric oxide (NO) in the ambient atmosphere. Dilute mixtures of known concentrations of NO₂ in the air were prepared by passing purified air over an NO₂ permeation tube. Known amounts of NO were then metered into the dilute NO₂ gas stream, and the entire mixture was analyzed by the reference method for NO₂. The response obtained from the reference method, with and without NO in the dilute NO₂ gas stream, was noted and results appear in table 1.

TABLE 1.—Effect of NO on the reference method for NO₂

$\mu\text{g}/\text{m}^3$		Ratio, NO/NO ₂	Expected NO ₂ recovered, percent	Apparent, NO ₂ recovered, percent
NO ₂	NO			
100	0	0	39	38
102	63	.6	39	38
105	127	1.2	38	52
122	627	5.1	36	57
189	0	0	29	29
244	1205	4.9	24	45
249	1279	5.2	23	55
215	1242	5.8	26	50
311	0	0	20	17
316	111	.4	20	30
318	332	1.1	20	33
356	1060	3.0	18	44

The reference method as published contains directions on how to calculate the concentration of NO₂ ($\mu\text{g}/\text{m}^3$ and ppm) in the air sampled. In these calculations a correction is included for the overall efficiency of the method which historically had been determined to be 35 percent. Inspection of figure 1 shows that at low concentrations of NO₂ in the atmosphere (30-60 $\mu\text{g}/\text{m}^3$), where collection efficiencies are much higher than 35 percent, the reported concentrations

of NO₂ will be much higher than the actual ambient level. The positive interference from NO, the extent of which still needs further evaluation, could also be important in these areas of low concentration. In areas where the ambient level of NO₂ is above 120-130 $\mu\text{g}/\text{m}^3$, a 35 percent collection efficiency factor is approximately valid, at higher atmospheric concentrations, the application of the 35 percent correction factor will underestimate the actual NO₂ concentration in the air sampled.

In summary, EPA's analysis indicates that the reference method is deficient in two respects. First, the method overestimates nitrogen dioxide concentrations at low levels and underestimates them at high levels because the collection efficiency of the absorbing reagent is dependent upon nitrogen dioxide concentration being measured. Second, the method is subject to positive interference by nitric oxide. Since the variable collection efficiency problem cannot be resolved, this method can no longer serve as the reference method.

Over the past year, EPA has used other nitrogen dioxide measurement techniques in conjunction with the routine activities of the continuous air monitoring program (CAMP) and the national air surveillance network (NASN). Four 24-hour bubbler methods were operated at approximately 200 NASN sampling sites for various periods in 1972. Continuous chemiluminescence instruments were placed in 41 air quality control regions. Saltzman instruments were used at each of the six CAMP sites.

Since the major problem with the reference method is the variable collection efficiency of the absorbing reagent, many absorbing systems have been examined.

The one that has given the best results is based upon the addition of small amounts of sodium arsenite to the sampling reagent. Two arsenite systems, which differ only in the type of gas-disbursing devices used, were utilized.

The chemiluminescence instruments operated during the study were beset with many operating problems; however, EPA believes that the chemiluminescence method shows technical promise as an acceptable method to monitor nitrogen dioxide in the ambient air.

The continuous Saltzman method is thought to yield precise and accurate results at high concentrations of nitrogen dioxide (≥ 0.10 parts per million); however, investigations have shown a negative interference caused by ozone. Further evaluation, especially at lower levels of nitrogen dioxide in ambient air, is needed.

Based on the studies conducted over the past year, EPA believes that three nitrogen dioxide sampling techniques should be considered as proposed methods to replace the current reference method. Specifically, these proposed methods are the arsenite method, using an orifice bubbler; the continuous chemiluminescence method; and the continuous Saltzman method. EPA further believes, however, that one additional year is needed to complete method evaluations and collaborative testing before a new reference method for nitrogen dioxide can be selected.

Accordingly, it is the Administrator's intention, following completion of these additional studies, to propose amendments to 40 CFR 50 to withdraw the current reference method and designate a new one. Technical descriptions of the three current candidate methods, are set forth below. It is anticipated that EPA will propose the selection of a new reference method about March 1974. At that point, EPA will publish a formal proposal, together with supporting data. It is possible although not considered likely at this time, that the method eventually selected may be a method other than those described below.

Interested persons are invited to submit information and comments pertinent to this matter. Submittals should be made, preferably in triplicate to the Environmental Protection Agency, National Environmental Research Center, Research Triangle Park, N.C. 27711, attention: Dr. Sherer. All relevant information and comments received not later than 180 days from the publication of this notice will be considered in the development of a formal proposal concerning the reference method. Comments received by EPA will be available for public inspection during normal business hours at the Office of Public Affairs, 401 M Street SW., Washington, D.C. 20460.

This advance notice of proposed rule-making is issued under the authority of section 109 of the Clean Air Act, as amended (42 U.S.C. 1857c-4).

Dated May 29, 1973.

ROBERT W. FRI,
Acting Administrator.

It is proposed that part 50, chapter I, title 40, Code of Federal Regulations, be amended as follows:

1. In appendix F, it is proposed to delete the title and description of the reference method for determination of nitrogen dioxide.

2. It is proposed to revise appendix F to set forth one of the following three methods as the reference method for determination of nitrogen dioxide.

TENTATIVE CANDIDATE METHOD FOR THE DETERMINATION OF NITROGEN DIOXIDE IN THE ATMOSPHERE (24-HOUR SAMPLING METHOD)

1. *Principle and applicability.*—1.1 Nitrogen dioxide is collected by bubbling air through a sodium hydroxide-sodium arsenite solution to form a stable solution of sodium nitrite.¹ The nitrite ion produced during sampling is reacted with phosphoric acid, sulfanilamide, and N-1-naphthylethylenediamine dihydrochloride to form an azo dye and then determined colorimetrically.

1.2 The method is applicable to collection of 24-hour samples in the field and subsequent analysis in the laboratory.

2. *Range and sensitivity.*—2.1 The range of the analysis is 0.02 to 2 $\mu\text{g NO}_2/\text{ml}$ (Beers law is obeyed through this range). Above 2.0 $\mu\text{g NO}_2/\text{ml}$ dilutions are needed. With 50 ml absorbing reagent

and a sampling rate of 200 cm^3/min for 24 hours, the range of the method is 5 to 750 $\mu\text{g}/\text{m}^3$ (0.003 to 0.4 p/m) nitrogen dioxide.

2.2 A concentration of 0.04 $\mu\text{g NO}_2/\text{ml}$ will produce an absorbance of 0.02 with 1 cm cells.

3. *Interferences.*—3.1 The interference of sulfur dioxide with the azo dye formation in the colorimetric determination is eliminated by converting it to sulfate ions with hydrogen peroxide before analysis.²

3.2 A slight positive NO interference has been observed at NO_2 levels above 100 $\mu\text{g}/\text{m}^3$ when the NO to NO_2 mole ratio is 3:1 or greater. Studies have shown that NO can increase the NO_2 response by 3 to 15 percent at high NO and NO_2 levels.³

4. *Precision, accuracy, and stability.*—

4.1 Relative standard deviation of 5 percent and 6 percent can be expected at nitrogen dioxide concentrations of 40 $\mu\text{g}/\text{m}^3$ and 60 $\mu\text{g}/\text{m}^3$, respectively, based on an automated analysis of samples collected from a standard test atmosphere. Precision would probably be different when the analysis is performed manually.

4.2 Collected samples are stable for at least 6 weeks.

4.3 Collected samples are stable for at least 6 weeks.

5. *Apparatus.*—5.1 Sampling. See figure F1.

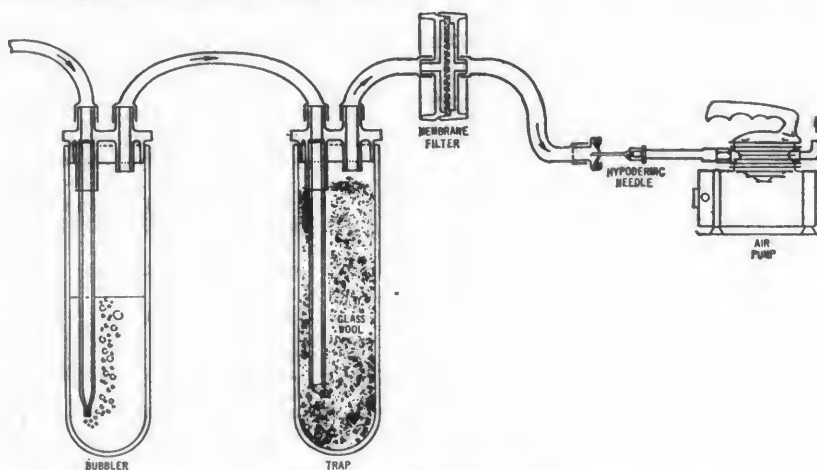


FIGURE F1.—Sampling train.

5.1.1 Absorber. Polypropylene tubes 164 by 32 mm, equipped with polypropylene two-port closures. Calibrate the absorber tube by adding exactly 50 ml of distilled water to the tube, then scribe a mark at the top of the liquid level. Rubber stoppers cause high and varying blank values and should not be used. The gas dispersion tube—a glass tube with the bubbler end drawn out to 0.6 ± 0.2 mm i.d. and approximately 152 mm long—is used. The dispersion tube should be positioned so as to allow a clearance of 6 mm from the bottom of the absorber.

5.1.2 Probe. Teflon, polypropylene, or glass tube with a polypropylene or glass funnel at the end.

¹ Christie, A. A., Lidzey, R. G., and Radford, D. W. F., *Analyst*, 95, 519 (1970).

5.1.3 Flow control device. Calibrated 27-gauge hypodermic needle, three-eighths of an inch long to maintain a flow of approximately 200 cm^3/min . The needle should be protected by a membrane filter placed between the glass wool trap and the needle. Change the filter after collecting 10 samples.

5.1.4 Air pump. Capable of maintaining a pressure differential of at least 0.6 atm across the flow control device.

5.1.5 Calibration equipment. Flowmeter for measuring airflows up to ap-

² Jacobs, M. B., and Hochheiser, S., "Continuous Sampling and Ultramicro-determination of Nitrogen Dioxide in Air," *Anal. Chem.* 30, 426 (1958).

³ Unpublished results, Environmental Protection Agency, Research Triangle Park, N.C.

proximately 275 cm³/min within ± 2 percent, stopwatch, and precision wet test meter (1 liter/revolution).

5.2 Analysis.

5.2.1 Volumetric flasks. 50, 100, 200, 250, 500, 1,000 ml.

5.2.2 Graduated cylinder. 1,000 ml.

5.2.3 Pipets. 1, 2, 5, 10, 15 ml volumetric; 2 ml, graduated in 1/10 ml intervals.

5.2.4 Test tube.

5.2.5 Spectrophotometer of colorimeter. Capable of measuring absorbance at 540 nm. Bandwidth is not critical.

6. Reagents.—6.1 Sampling.

6.1.1 Absorbing reagent. Dissolve 4.0 g sodium hydroxide (ACS reagent grade) in distilled water, add 1 g of sodium arsenite (ACS reagent grade) and dilute to 1,000 ml with distilled water.

6.2 Analysis.

6.2.1 Sulfanilamide. Dissolve 20 g sulfanilamide in 700 ml distilled water. Add, with mixing, 50 ml concentrated phosphoric acid (85 percent ACS reagent grade) and dilute to 1,000 ml. This solution is stable for a month if refrigerated.

6.2.2 NEDA solution. Dissolve 0.5 g N-1-naphthylethylenediamine dihydrochloride (NEDA) in 500 ml of distilled water. This solution is stable for a month if refrigerated and protected from light.

6.2.3 Hydrogen peroxide. Dilute 0.2 ml of 30 percent hydrogen peroxide to 250 ml with distilled water. This solution may be used for a month if protected from light.

6.2.4 Standard nitrite solution. Dissolve sufficient desiccated sodium nitrite (NaNO₂, assay of 97 percent or greater) and dilute with distilled water to 1,000 ml so that a solution containing 1,000 μg NO₂/ml is obtained. The amount of NaNO₂ to use is calculated as follows:

$$G = \frac{1.500}{A} \times 100$$

G = Amount of NaNO₂, g.

1.500 = Gravimetric factor in converting NO₂ into NaNO₂.

A = Assay, percent.

7. Procedure.—7.1 Sampling. Assemble the sampling apparatus as shown in figure F1. Add exactly 50 ml of absorbing reagent to the calibrated absorber. Disconnect funnel, insert calibrated flowmeter, and measure flow before sampling denoted as F_1 in 9.1.1. If flow rate before sampling is less than 95 percent of needle calibration, check the system for leaks and change the filters if necessary. Remove flowmeter and replace funnel. Sample for 24 hours from midnight to midnight if possible and measure flow at end of sampling period denoted as F_2 .

7.2 Analysis. Replace any water lost by evaporation during sampling by adding distilled water until level reaches calibration mark. Pipet 10 ml of the collection sample into a test tube. Add 1.0 ml hydrogen peroxide solution, 10.0 ml sulfanilamide solution, and 1.4 ml NEDA solution with thorough mixing after the addition of each reagent. Prepare a blank in the same manner with 10 ml absorbing reagent. After a 10-minute color-development interval, measure the absorbance at 540 mm against the blank. Read μg NO₂/ml from standard curve (§ 8.2).

Samples with an absorbance greater than that obtained with the 2.0 $\mu\text{g}/\text{ml}$ standard should be diluted with the absorbing reagent until the absorbance of the sample is within the range of the calibration curve.

8. Calibration and efficiencies.—8.1 Sampling.

8.1.1 Calibration of flowmeter. With a wet test meter and a stopwatch, determine the rates of airflow (cm³/min) through the flowmeter at several ball positions. Plot ball positions versus flow rates.

8.1.2 Calibration of hypodermic needle. Connect the calibrated flowmeter, the needle to be calibrated, and the source of vacuum in such a way that the direction of airflow through the needle is the same as in the sampling train (fig. 1). Read the position of the ball and determine flow rate in cm³/min from the calibration chart prepared in 8.1.1. Reject all needles not having flow rates between 190 and 210 cm³/min before sampling.

8.2 Calibration curve. Dilute 5.0 ml of the 1,000 μg NO₂/ml solution to 200 ml with absorbing reagent. This solution contains 25 μg NO₂/ml. Pipet 1, 2, 5, and 15 ml of the 25 μg NO₂/ml solution into 50-, 50-, 100-, and 250-ml volumetric flasks and dilute to the mark with absorbing reagent. The solutions contain 0.50, 1.00, 1.25, and 1.50 μg NO₂/ml, respectively. Run standards as instructed in 7.2. Plot absorbance versus μg NO₂/ml. When samples are obtained with lower levels prepare additional standard in the range of 0.01 to 0.5 μg NO₂/ml and run as indicated above.

8.3 Efficiencies. The overall average efficiency of the method is 85 percent over the range of 50 to 750 $\mu\text{g}/\text{m}^3$ NO₂ concentration.

9. Calculation.—9.1 Sampling.

9.1.1 Calculate volume of air sampled.

$$V = \frac{F_1 + F_2}{2} \times T \times 10^{-6}$$

V = Volume of air sampled, m³.

F_1 = Measured flow rate before sampling, cm³/min.

F_2 = Measured flow rate after sampling, cm³/min.

T = Time of sampling, min.

10^{-6} = Conversion of cm³ to m³.

9.2 Calculate the concentration of nitrogen dioxide as μg NO₂/m³.

$$\mu\text{g NO}_2/\text{m}^3 = \frac{(\mu\text{g NO}_2/\text{ml}) \times 50}{V \times 0.85}$$

50 = Volume of absorbing reagent used in sampling, ml.

V = Volume of air sampled, m³.

0.85 = Collection efficiency.

9.2.1 If desired, concentration of nitrogen dioxide may be calculated as p/m NO₂.

$$p/m = (\mu\text{g NO}_2/\text{m}^3) \times 5.32 \times 10^{-6}$$

TENTATIVE METHOD FOR THE CONTINUOUS MEASUREMENT OF NITROGEN DIOXIDE (COLORIMETRIC)

1. Principle and applicability.—1.1 This method is based on a specific reaction of nitrite ion (NO₂⁻) with diazotizing-coupling reagents to form a deeply colored azo dye which is measured

colorimetrically. The nitrogen dioxide (NO₂) in the ambient air is converted to nitrite ion (NO₂⁻) upon contact with an absorbing solution containing the diazotizing-coupling reagents. The absorbance of the azo dye is directly proportional to the concentration of NO₂ absorbed.

1.2 This method is applicable to the measurement of NO₂ at concentrations in the ambient air from 18.8 $\mu\text{g}/\text{m}^3$ to 1880 $\mu\text{g}/\text{m}^3$ (0.01–1 p/m).

2. Range.—2.1 A wide variety of ranges is possible. A nominal range of 0 to 1880 $\mu\text{g}/\text{m}^3$ (0 to 1 p/m) with nonlinear response is quite common for ambient monitoring. Recently developed instruments are capable of giving linear response in ranges of 0 to 376 $\mu\text{g}/\text{m}^3$ (0 to 0.2 p/m) and 0 to 940 $\mu\text{g}/\text{m}^3$ (0 to 0.5 p/m).

3. Interferences.—3.1 Interferences from other gases that might be found in the ambient air have been reported to be negligible; however, most interferent studies have been done on manual procedures which may not be applicable to continuous methods. Recent studies indicate that ozone produces a negative interference as follows: Ratio of NO₂ to ozone 1:1=5.5 percent, 2:1=19 percent and 3:1=32 percent.

4. Apparatus.—4.1 General description.—Sample air is drawn through a gas/liquid contact column at an accurately determined flow rate counter-current to a controlled flow of absorbing reagent. All sample inlet lines prior to the absorber column should be constructed of either glass or Teflon. The absorber must be carefully designed and properly sized because NO₂ is somewhat difficult to absorb. Sufficient time is allowed for full color development, and then the colored solution is passed through a colorimeter where the absorbance is measured continuously at about 550 nm.

4.2 Installation.—Instruments should be installed on location and demonstrated, preferably by the manufacturer, to meet or exceed manufacturer's specifications and those described in this method.

4.3 Absorbing solution.—The two most widely used absorbing solutions for this procedure are the Griess-Saltzman¹ reagent and the Lyshkow² modification of the Griess-Saltzman reagent. Either of these is acceptable. The composition of these solutions is as follows:

(1) Griess-Saltzman. 0.5 g. sulfanilic acid, 50 ml glacial acetic acid, and 50 ml. of 0.1 percent N-(1-naphthyl)-ethylenediamine dihydrochloride diluted to 1 liter with deionized water.

(2) Lyshkow. 1.50 g. sulfanilamide, 15 g. tartaric acid, 0.05 g. N-(1-naphthyl)-ethylenediamine dihydrochloride, 0.05 g. 2-naphthol 3,6 disulfonic acid disodium salt, and 0.25 ml Kodak photoflow (as a

¹ Saltzman, B. E., "Colorimetric Micro Determination of Nitrogen Dioxide in the Atmosphere," Anal. Chem. 26, 1949 (1954).

² Saltzman, B. E., "Modified Nitrogen Dioxide Reagent for Recording Air Analyzers," Anal. Chem. 32, 135 (1960).

³ Lyshkow, N. A., "A Rapid Sensitive Colorimetric Reagent for Nitrogen Dioxide in Air," JAPCA 15:10, 481 (1965).

wetting agent) diluted to 1 liter with de-ionized water.

5. Calibration.—5.1 Permeation tube method.—Atmospheres containing accurately known amounts of NO₂ at levels of interest can be prepared using permeation tubes. In the system for generating these atmospheres the permeation tube emits NO₂ gas at a known constant rate, provided the temperature of the tube is held constant ($\pm 0.1^\circ\text{C}$) and provided the tube has been accurately calibrated at the temperature of use. The NO₂ gas permeating from the tube is carried by a low flow of dry inert gas to a mixing chamber where it is accurately diluted with dry NO₂ free air to the level of interest. Systems for preparation of standard atmospheres have been described in detail by O'Keefe and Ortman,⁴ Scaringelli, O'Keefe, Rosenberg and Bell,⁵ and Scaringelli, Rosenberg and Rehme.⁶ Commercial calibration systems using the permeation tube technique are now available.

5.1.1 Preparation of standard atmospheres.—Permeation tubes may be prepared or purchased. Scaringelli, O'Keefe, Rosenberg, and Bell,⁵ give detailed explicit directions for permeation tube calibration. Tube permeation rates from 0.2 to 3.0 $\mu\text{g}/\text{min}$, inert gas flow of about 50 ml per minute and dilution flow rates from 1 to 20 l/min, conveniently give standard atmospheres containing desired levels of NO₂ (9.4 to 1880 $\mu\text{g}/\text{m}^3$). The concentration of NO₂ in any standard atmosphere can be calculated as follows:

$$C = \frac{P \times 10^3}{R_a + R}$$

sampling. Plot the concentration of NO₂ in microgram/cubic meter (x axis) against instrument response (y axis), draw the line of best fit.

6. Procedure.—6.1 Calibrate the instrument as described in 5. For specific operating instructions, refer to the manufacturer's manual. The instrument should be calibrated dynamically at least once per month. Static calibration checks are recommended daily or at least once per week. Most instruments have a static calibration mode through which sodium nitrite standard solutions can be introduced.

7. Calculations.—7.1 Determine the concentration directly from the calibration curve. No calculations are necessary.

7.2 NO₂ concentrations in micro-

grams per cubic meter are converted to parts per million as follows:

$$p/m \text{ NO}_2 = \frac{\mu\text{g}/\text{NO}_2/\text{m}^3}{1880}$$

TENTATIVE METHOD FOR THE CONTINUOUS MEASUREMENT OF NITROGEN DIOXIDE (CHEMILUMINESCENT)

1. Principle and applicability.—1.1 Atmospheric concentrations of nitric oxide (NO) can be measured by the chemiluminescent reaction of ozone with nitric oxide at reduced or near atmospheric pressure.¹ Nitrogen dioxide (NO₂) is measured as nitric oxide in the system after conversion of nitrogen dioxide to nitric oxide. (NO).^{2,3} Air samples are drawn directly into the analyzer to establish a nitric oxide response; then a switching valve directs the sample air through the converter where the NO₂ is converted to NO. The photomultiplier measures the light energy resulting from the chemiluminescent reactions of NO and O₃. By subtracting the NO signal from the NO₂ signal, the amount of NO₂ is determined. The subtractive process is accomplished electronically. Total time for both measurements is less than a minute.

1.2 The method is applicable to the measurement of nitrogen dioxide at con-

centrations in the atmosphere from 9.4 to 18,800 $\mu\text{g}/\text{m}^3$ (0.005–10 p/m).

2. Range and lower detectable limit.—2.1 A wide variety of ranges are possible in the measurement of nitrogen dioxide. Recommended ranges are 0–376 $\mu\text{g}/\text{m}^3$ (0–0.2 p/m), 0–990 $\mu\text{g}/\text{m}^3$ (0–0.5 p/m), 0–1,880 $\mu\text{g}/\text{m}^3$ (0–1 p/m), 0–3760 $\mu\text{g}/\text{m}^3$ (0–2 p/m), and 0–18,800 $\mu\text{g}/\text{m}^3$ (0–10 p/m). Separate range selectors should be made available for NO, NO₂, and NO_x if possible. These higher ranges are included because NO_x concentrations often exceed 1 p/m.

2.2 The lower detectable limit of the chemiluminescent method for the measurement of nitrogen dioxide at range (0–376 $\mu\text{g}/\text{m}^3$) is 9.4 $\mu\text{g}/\text{m}^3$ (0.005 p/m).

3. Interferences.—3.1 The chemiluminescent detection of NO with ozone is not subject to interference from any of the common air pollutants such as O₃, NO₂, CO, NH₃, and SO₂.

3.2 When the instrument is operated in the NO_x mode any compounds which may be oxidized to NO in the thermal NO₂ converter are potential interferences. The principal compound of concern is ammonia; however, this is not an interference for converters operated at less than 300°C. Unstable nitrogen compounds, such as PAN and organic nitrites decompose thermally to form NO and

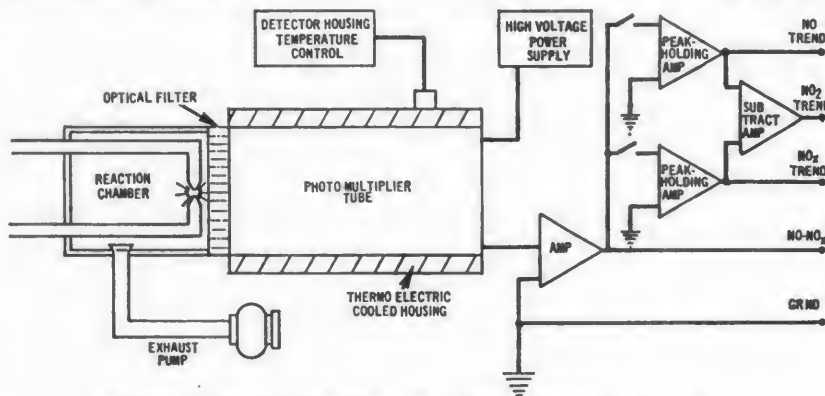


FIGURE 1.—Automated NO, NO₂, NO_x chemiluminescent analyzer.

may represent minor interferences in some polluted atmospheres.

¹ This factor represents the concentration of NO₂ in $\mu\text{g}/\text{m}^3$ equivalent to 1 p/m NO₂ by volume. The figure was generated for 25°C and 760 mm Hg.

²Contijn, A., Sabadell, A. J., and Ronco, R. J., "Homogeneous Chemiluminescent Measurement of Nitric Oxide with Ozone," Anal. Chem. 42:6, 575 (1970).

³Hodgeson, J. A., Bell, J. P., Rehme, K. A., Krost, K. J., and Stevens, R. K., "Application of a Chemiluminescent Detector for the Measurement of Total Oxides of Nitrogen and Ammonia in the Atmosphere." Proceedings of the Joint Conference on Sensing of Environmental Pollutants, Palo Alto, Calif., Nov. 8, 1971. (American Institute of Aeronautics and Astronautics, New York, N.Y.), paper No. 71-1067.

⁴Hodgeson, J. A., Rehme, K. A., Martin, B. E., and Stevens, R. K., "Measurements for Atmospheric Oxides of Nitrogen and Ammonia by Chemiluminescence." Presented at the Air Pollution Control Association Meeting, Miami, Fla., June 1972, paper No. 72-12.

4. Apparatus.—4.1 General description.—Most analyzers consist of a particulate filter, thermal converter,³ ozone generator, reaction chamber, optical filter, photomultiplier tube, and vacuum pump. See figure 1 for a general schematic of the chemiluminescent analyzer.

5. Reagents.—5.1 Oxygen.—A cylinder of extra dry oxygen is recommended as a source for the generation of ozone.

6. Calibration.—6.1 Refer to addenda C.

7. Procedure.—7.1 Sampling ambient air is accomplished by following the procedure described in 6.1. The sample is pulled into the instrument by a sample pump or by vacuum from the vacuum pump used in the detector. Ozonized oxygen at a constant flow is drawn into the detector. Figure 1 shows a typical flow

⁵Stevens, R. K., and Hodgeson, J. A., "Application of Chemiluminescent Reactions to the Measurement of Air Pollutants," Anal. Chem., April issue 1973.

⁴O'Keefe, A. E. and Ortman, G. C., "Primary Standards for Trace Gas Analysis," Anal. Chem. 38, 760 (1966).

⁵Scaringelli, F. P., O'Keefe, A. E., Rosenberg, E., and Bell, J. P., "Permeation of Known Concentrations of Gases and Vapors with Permeation Devices Calibrated Gravimetrically," Anal. Chem. 42, 871 (1970).

⁶Scaringelli, F. P., Rosenberg, E., and Rehme, K. A., "Comparison of Permeation Tubes and Nitrite Ion as Standards for the Colorimetric Determination of Nitrogen Dioxide," Environ. Sci. Tech. 4, 924-929 (1970).

diagram. For exact operating procedures refer to manufacturer's instruction manual.

8. Calculation.—8.1 Concentrations of NO and NO₂ found in the atmosphere can be obtained by referring directly to the individual calibration curves.

ADDENDA

A. Minimum performance specifications for atmospheric analyzers for nitrogen dioxide:

	Units ¹	Colorimetric	Chemiluminescent
Range ²	p/m	0-0.5	0-0.5
Noise.....	p/m	0.005	0.005
Lower detectable limit.....	p/m	0.01	0.01
Interference equivalent:			
Each interferent.....	p/m	±0.02	±0.02
Total interferent.....	p/m	0.04	±0.04
Zero drift:			
12 Hour ³	p/m	±0.02	±0.02
24 Hour.....	p/m	±0.02	±0.02
Span drift.....	p/m	±0.02	±0.02
Lag time.....	min	20	0.5
Rise time, 95%.....	min	15	1.0
Fall time, 95%.....	min	15	1.0
Precision:			
20% of upper range limit.....	p/m	0.02	0.02
80% of upper range limit.....	p/m	0.03	0.03

¹ To convert from p/m to µg/m³ at 25° C and 760 mm, multiply by 1,880.

² No performance test required. All other performance specifications are tested on instruments operating in the range specified.

³ Determined by measuring zero gas under conditions of continuous operation.

B. Definitions of performance specifications:

Range.—Minimum and maximum concentrations which the system shall be capable of measuring.

Noise.—Spontaneous, short duration deviations in the instrument output about the mean output, which are not caused by input concentration changes.

Lower detectable limit.—The minimum pollutant concentration which produces a signal of twice the noise level.

Interference equivalent.—Positive or negative output caused by a substance other than the one being measured.

Zero drift.—The change in instrument output over a stated time period of unadjusted continuous operation, when the input concentration of pollutant is zero.

Span drift.—The change in instrument output over a stated time period of unadjusted continuous operation, when the input pollutant concentration is a stated upscale value.

Lag time.—The time interval between a step change in input concentration at the instrument inlet to the first observable corresponding change equal to twice the noise in the instrument output.

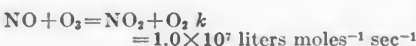
Rise time.—The time interval between initial response and 95 percent of final response after a step increase in input concentration.

Fall time.—The time interval between initial response and 95 percent of final response after a step decrease in input concentration.

Precision.—Variation about the mean of repeated measurements of the same concentration. This variation is expressed as one standard deviation about a mean.

C. Method for the calibration of NO, NO₂, and NO_x analyzers by gas-phase titration:

1. Principle and Applicability.—1.1 The following is a gas phase technique for the dynamic calibration of ambient air monitors for nitric oxide (NO), nitrogen dioxide (NO₂), total oxides of nitrogen (NO_x) analyzers. The technique is based upon application of the rapid gas phase reaction between NO and O₃ to produce a stoichiometric quantity of NO₂.^{1,2}



The quantitative nature of the reaction is used in a manner such that, knowing the concentration of one component, the

concentrations of the other two are determined.

Nitric oxide from a calibrated cylinder of NO in N₂ (50–100 p/m) is diluted with a constant flow of clean air to provide NO concentrations at the exit manifold in the range from 0.05 to 1 p/m. Upstream of the point of NO addition, the clean air stream passes through an ozonizer,³ which produces variable ozone concentrations from 0 to 1 p/m at the sample manifold. The mixing point of ozonized air with NO is shown in figure 1. Between the mixing point and the sample manifold, a reaction vessel is located which provides a residence time long enough for quantitative reaction to occur when O₃ concentrations up to 75 percent of the initial NO concentration are added.

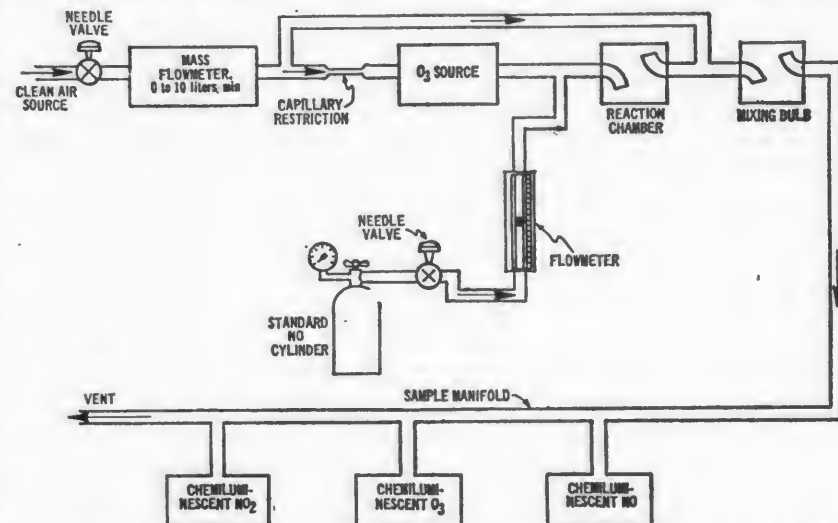


FIGURE 2.—Flow scheme for calibration of NO, NO₂, NO_x, and O₃ monitors by gas-phase titration.

Upstream of the ozonizer, the airstream is split such that 10 percent of the flow passes through the O₃ source and 90 percent through a bypass line. The ozonized 10 percent flow mixes directly with the NO stream and recombines with the 90 percent bypass flow downstream of the reaction vessel. The stream is split in order to produce locally high concentrations of O₃ and NO in the reaction chamber (10₃, reaction chamber = 10 × [O₃], manifold), which in turn provides a quantitative reaction within a small volume. The same concentrations are produced at the manifold regardless of the ratio of bypass flow to source flow.

When excess NO is present, the amount of O₃ added is equivalent to the amount of NO consumed and equivalent to the concentration of NO₂ formed. This is

the fundamental interrelation among concentrations for the three gases.

An outline of the general calibration scheme follows. The standard cylinder of NO in N₂ is initially recalibrated using gas phase titration (GPT) with ozone concentrations which have been analyzed by iodometry (see § 7.1 for details). An acceptable alternative method, not described, for cylinder calibration would be by comparison of NO₂ concentrations produced by gas phase titration with the output of a gravimetrically calibrated permeation tube. Once the NO concentration in the cylinder has been confirmed, this cylinder may be used over its lifetime to provide a working standard for routine calibrations.

In routine calibration, NO analyzers are calibrated by dynamic flow dilution of the cylinder gas. To calibrate NO₂ and O₃ analyzers, a constant concentration of NO at approximately 1 p/m is produced in the flow system. Ozone is added in increments from the variable O₃

¹ J. A. Hodgeson, R. E. Baumgardner, B. E. Martin, and K. A. Rehme, "Stoichiometry in the Neutral Iodometric Procedure for Ozone by Gas-Phase Titration with Nitric Oxide," *Anal. Chem.* 43, 1123 (1971).

² K. A. Rehme, B. E. Martin and J. A. Hodgeson, "The Application of Gas-Phase Titration in the Simultaneous Calibration of NO, NO₂, NO_x, and O₃ Atmospheric Monitors," presented at the 164th ACS national meeting, New York City, September 1972.

³ J. A. Hodgeson, R. K. Stevens, and B. E. Martin, "A Stable Ozone Source Applicable as a Secondary Standard for Calibration of Atmospheric Monitors," *ISA Transactions* 11, 161 (1972).

source. The incremental decreases, observed on the spanned NO detector, are than equivalent to the concentrations produced by the O₃ source and serve to calibrate the source. Since NO₂ produced is equivalent to O₃ consumed, the calibrated O₃ source also becomes a calibrated NO₂ source when NO is present in excess.

1.2 This technique has been primarily designed for the calibration of chemiluminescent analyzers for NO, NO₂, and NO_x. Any detector which has a rapid and linear response to NO could be used as the indicator in the GPT step. Only those type NO₂ analyzers which do not respond to NO may be calibrated, since the NO₂ calibration samples will contain a small excess of NO. Colorimetric instruments can be calibrated using this technique if the ozone source is calibrated in accordance with the FEDERAL REGISTER procedure.⁷

2. Ranges.—The following procedures are applicable to the generation of calibration samples for NO in the range from 0.01 to 1 p/m for NO and NO₂.

3. Interferences.—No other interfering gases are present in calibration samples produced for O₃ and NO. NO₂ analyzers which suffer interference from NO cannot be calibrated by this method, since some NO is present in the NO₂ calibration sample produced.

4. Precision, accuracy, and stability.—

4.1 Precision.—The definition of the term precision as applied to the generation of calibration gases is at present uncertain. However, a given concentration of any of the three gases can be generated from day to day with an estimated reproducibility of ±2 percent.

4.2 Accuracy.—The accuracy in the concentrations of the calibration gases produced (NO, NO₂, or O₃) is estimated to be ±3 percent. This is determined by the accuracy of the primary calibration scheme used, in this case iodometric O₃ analysis.

4.3 Stability.—The concentrations of calibration gases produced by GPT are stable to within ±1 percent over 1-hour period.

5. Apparatus.—Figure 1 is a schematic of the GPT apparatus showing the placement of most of the components listed below.

5.1 Air flow controller.—A device capable of maintaining constant airflow; e.g., a differential pressure regulator.

5.2 Air flowmeters.—A flowmeter capable of monitoring airflows between 0–10 l/min; also a wet test meter or volumetric soap bubble meter for calibration and absolute flow measurements in this range.

5.3 Pressure regulator for standard NO cylinder.—Stainless steel internal parts with Teflon or Kel-F seat.

5.4 Nitric oxide flowmeters.—A flowmeter capable of monitoring NO flows between 0–100 cc/min and a 25 cc soap bubble meter for absolute flow measurements in this range. The NO flow must

be measured and controlled within an accuracy of ±2 percent.

5.5 Capillary restriction.—Glass or stainless steel capillary of sufficient length and inside diameter to allow approximately 1.0 l/min of air to flow through the ozone generator at a total airflow of 10 l/min.

5.6 Ozone generator.—The ozone source consists of a quartz tube into which ozone-free air is introduced and then irradiated with a stable low-pressure mercury lamp. The level of irradiation is controlled by an adjustable aluminum sleeve which fits around the lamp. Ozone concentrations are varied by adjustment of this sleeve. At a fixed level of irradiation, ozone is produced at a constant rate. This generator is described completely in reference 3.

5.7 Reaction chamber and mixing bulb.—The reaction chamber and mixing bulb volumes are approximately 150 cm³.

5.8 Sample manifold.—A multipoint all-glass manifold is recommended. All connections in the calibration system should be glass or Teflon.

5.9 Nitric oxide detector.—A nitric oxide monitor is used as an indicator in the calibration procedure. The detector should be of the chemiluminescent type which is based on the light producing reaction between NO₂ at reduced⁸ or atmospheric⁹ pressure. Detectors of this type are available commercially from several companies.

5.10 Iodometric calibration apparatus.—The iodometric apparatus required for the primary calibration of the NO cylinder is described in the FEDERAL REGISTER.⁷

6. Reagents.—6.1 Nitric oxide standard cylinder.—Cylinder containing 100 p/m NO in N₂ with less than 1 p/m NO₂.

6.2 Clean air supply.—Cylinder air or purified air containing no more than 0.002 p/m of NO, NO₂, and O₃.

7. Procedure.—7.1 Primary calibration of the NO cylinder.

7.1.1 Ozone generator calibration.—A multipoint calibration of the ozone generator is obtained using the neutral-buffered KI procedure as described in the FEDERAL REGISTER.⁷

7.1.2 Gas phase titration.—The NO concentration in the cylinder is determined as follows: With the NO flow off, set the clean air flow at a value of ap-

proximately 5 l/min, measure and record the absolute airflow, F₀. If a 100-p/m range is available, span the NO monitor by sampling directly from the output of the 100-p/m NO cylinder. If a 100-p/m range is not available, generate approximately 1.0 p/m NO by dilution and span the instrument on a 0–1 p/m range. After the NO response on the NO detector has stabilized, record the initial detector reading and then add approximately 0.1 p/m O₃ by opening the sleeve on the ozone generator. Allow the NO response to stabilize and record the resultant detector reading. Adjust sleeve to obtain 0.2 p/m O₃ and allow NO response to stabilize. Continue this procedure until up to 0.8 p/m O₃ has been added in a stepwise fashion.

7.1.3 Calculation.—Plot the NO detector readings in pm (y axis) versus O₃ concentration added (x axis). Draw a straight line from the y axis through the linear portion of the titration curve and extrapolate to the x axis. (See fig. 2 for example.) The concentration at the x axis intercept, C', is the O₃ concentration equivalent to the initial diluted NO concentration. The cylinder NO concentration is determined as follows:

$$C_{NO} = \frac{F_0 \times C'}{F_{NO}}$$

where:

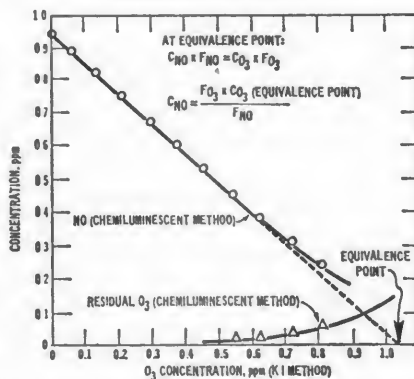
C_{NO} = Cylinder NO concentration, p/m.

F_{NO} = Measured NO flow, cc/min.

C' = Equivalence point O₃ concentration, p/m.

F₀ = Total clean air flow, cc/min.

FIGURE 3.—Gas-phase titration of NO with O₃.



7.2 Procedure for routine calibration of NO, NO₂, and NO_x monitors.—The following procedure is recommended for routine calibration:

7.2.1 Zero adjustment.—Allow all instruments to sample clean air until a stable response is obtained. Clean air supply should contain no more than 0.002 p/m of NO, NO₂, and O₃. After the response has stabilized, make proper zero adjustment.

7.2.2 Calibration of NO monitors (0–1.0 p/m range).—Span the NO instruments on a 0 to 1.0 p/m range as follows. Generate a NO concentration in the 0.9 to 1.0 p/m range by flow dilution. The flow rate of NO added must be measured accurately, preferably with a soap bubble meter in line (i.e., meter the NO flow into

⁷ Environmental Protection Agency, "Part 50—National Primary and Secondary Ambient Air Quality Standards," FEDERAL REGISTER, vol. 36, No. 228, pp. 22384–22397, Nov. 25, 1971.

⁸ A. Fontijn, A. J. Sabadell, and R. J. Ronco, "Homogeneous Chemiluminescent Measurement of Nitric Oxide with Ozone," Anal. Chem. 42, 575 (1970).

⁹ D. H. Stedman, E. E. Daby, F. Stuhl, and H. Niki, "Analysis of Ozone and Nitric Oxide by a Chemiluminescent Method in Laboratory and Atmospheric Studies of Photochemical Smog," J. Air Poll. Control Assoc. 22, 260 (1972).

⁷ J. A. Hodgeson, K. A. Rehme, B. E. Martin, and R. K. Stevens, "Measurements for Atmospheric Oxides of Nitrogen and Ammonia by Chemiluminescence," preprint, presented at 1972 APCA meeting, Miami, Fla., June 1972, paper No. 72-12.

⁷ Environmental Protection Agency, "Part 50—National Primary and Secondary Ambient Air Quality Standards," FEDERAL REGISTER, vol. 36, No. 228, pp. 22384–22397, Nov. 25, 1971.

the bubble meter and from the bubble meter into the system). After accurately measuring the NO flow, remove the bubble meter and meter the NO flow directly into the system. Calculate the exact NO concentration added by:

$$[NO] = \frac{F_{NO} \times C_{NO}}{F_T}$$

where

- [NO] = Diluted NO concentration, p/m.
 C_{NO} = Cylinder NO concentration, p/m.
 F_{NO} = NO flow rate, cc/min.
 F_T = Total flow at manifold, cc/min.
 $= F_{NO} + F_c$
 F_c = Total clean air flow.

After the NO instrument response has stabilized, adjust the instrument span control until the instrument output reads directly the concentration calculated above. Decrease the NO flow rate to yield a decreased NO concentration. Calculate the concentration added and record the NO instrument response. Repeat at several concentration values in the 0 to 1.0 p/m range. Plot instrument response versus calculated NO concentrations and draw the NO calibration curve. If the initial instrument span is done accurately, direct readout of concentration should be possible without reference to the calibration curve.

7.2.3 Calibration of NO_x monitors (0-0.5 p/m range).—Adjust the NO flow rate to establish 1.00 p/m NO as measured on the NO monitor. Open the sleeve on the ozone generator to add enough O₃ to decrease the NO response to 0.5 p/m. Note and record the sleeve setting on the ozone generator. This results in the generation of 0.5 p/m NO_x which is used to span the NO_x instruments. Allow the response of each NO_x instrument to stabilize and adjust the span controls to give a direct readout of 0.5 p/m. Decrease the added O₃ concentration by adjustment of the sleeve on the ozone generator. Again, note and record the sleeve setting on the ozone generator. Allow the instrument responses to stabilize before measuring. The decrease in response on the NO monitor yields the concentration of NO_x generated and the ozone source concentration.

$$[NO_2]_i = [O_3]_i = [NO]_o - [NO]_i$$

where

- [NO]_o = Initial NO concentration measured on NO monitor.
 [NO]_i = NO concentration after O₃ addition.
 [NO]_i = Resultant NO_x concentration.
 [O₃]_i = Added O₃ concentration.

Repeat at several added O₃ concentrations to obtain a multipoint calibration in the 0-0.5 p/m range. Plot the NO_x instrument response versus the NO_x concentration as determined above and draw the NO_x calibration curve.

[FR Doc.73-11168 Filed 6-7-73; 8:45 am]

[40 CFR Part 52]

APPROVAL AND PROMULGATION OF IMPLEMENTATION PLANS

Proposed Reclassification of Air Quality Control Regions

On April 30, 1971 (36 FR 8186), the Administrator of the Environmental

Protection Agency (EPA) promulgated national ambient air quality standards (40 CFR, pt. 50) for several air pollutants and designated reference methods for the measurement of ambient air concentrations of the pollutants involved. On June 14, 1972 (37 FR 11826), the Administrator stated that the reference method for measurement of nitrogen dioxide (appendix F to 40 CFR, pt. 50) was suspected of being unreliable. Since EPA's classification of air quality control regions (40 CFR, pt. 52) for the purpose of providing guidance to the States in developing plans for implementation of the national standards was, in most cases, based on measurements made with the reference method, EPA has reassessed its classification in light of data gathered over the past year. Of 47 air quality control regions originally classified priority I, EPA is now proposing to reclassify 43 as priority III and to retain the priority I classification in four cases. Because there are conflicting data on nitrogen dioxide levels in two of the latter cases, implementations of nitrogen dioxide control measures would not be required at this time.

The proposed reclassification reflects EPA's finding that measurements made with the reference method generally overestimated nitrogen dioxide concentrations. Based on this finding, EPA has concluded that nitrogen dioxide currently does not represent a widespread air pollution problem. Accordingly, EPA has made a reappraisal of the justification for the statutory requirement that light-duty motor vehicle emissions of nitrogen oxides be reduced by 90 percent from 1971 levels. The original justification relied upon an estimate of needed emission control in the worst case; i.e., Los Angeles. It was assumed, however, that there were many other areas with high nitrogen dioxide concentrations. EPA's measurements over the past year contradict that assumption. Furthermore, an analysis based on these new data indicates that such stringent control of motor vehicle emissions is not needed nationally for attainment or maintenance of the national ambient air quality standard.

Finally, because the national ambient air quality standard for nitrogen dioxide is based largely on an epidemiological study in which measurements were made with the reference method, EPA also has addressed the question of whether the original measurements were representative of actual exposure to nitrogen dioxide among the subjects of the study. Based on this investigation, EPA has concluded that the original measurements were, in fact, representative of actual exposure.

EPA's analysis of these matters and its findings and conclusions are described below in somewhat greater detail so that all interested parties will have an opportunity to review and comment on them. EPA is particularly interested in receiving comments on the motor vehicle emission control implications of this analysis. The only rulemaking actually proposed today is a reclassification of air

quality control regions, as set forth below, and a revision of requirements applicable to the development of States' control strategies for nitrogen dioxide, as set forth in a separate notice in this issue of the FEDERAL REGISTER. An advance notice of a proposal to designate one of three candidate methods as the Federal reference method, in lieu of the current reference method, is also set forth in a separate notice. It is the Administrator's intention to consider all comments submitted in response to these notices before he makes a final determination on any of the matters discussed herein.

REFERENCE METHOD

EPA's reevaluation of the reference method is discussed in some detail elsewhere in this issue of the FEDERAL REGISTER. Very briefly, it has indicated that it is deficient in two respects. First, it overestimates nitrogen dioxide concentrations at low levels and underestimates them at high levels because of the variable collection efficiency of the absorbing reagent, which is dependent upon the nitrogen dioxide concentration in the air sample. Second, the method is subject to positive interference by nitric oxide. Since the variable collection efficiency problem cannot be resolved, this method can no longer serve as the reference method. In a separate notice in this issue of the FEDERAL REGISTER, three other measurement methods, i.e., arsenite, chemiluminescence, and Saltzman, are proposed for consideration as candidates for designation as a new reference method.

AQCR RECLASSIFICATION

Based on measurements made with the reference method for measurement of nitrogen dioxide, the Administrator classified 47 air quality control regions (AQCRs) priority I with respect to nitrogen dioxide. An AQCR was classified priority I if the annual average was 110 micrograms per cubic meter or greater.

Over the past year, EPA has continued making measurements with the current reference method and other nitrogen dioxide measurement methods in conjunction with the routine activities of the continuous air monitoring program (CAMP) and the national air surveillance network (NASN). Four 24-hour bubbler methods, in addition to the current reference method (which is a 24-hour bubbler method), were used at approximately 200 NASN sampling sites for various periods. Chemiluminescence instruments, which are continuous samplers, were placed in 41 AQCRs originally classified priority I with respect to nitrogen dioxide; the sites at which these instruments were placed usually were not the NASN sites at which the arsenite instruments were placed. Data using the Saltzman continuous method were also collected at each of the six CAMP sites. Technical descriptions of these methods appear separately in this issue of the FEDERAL REGISTER.

Table 1 summarizes the measurements made with two of the candidate reference methods (arsenite and chemiluminescence) in AQCRs originally classified

priority I. Tables A-1 and A-2, which appear in appendix A, provide more detailed information. It should be emphasized that the arsenite and chemiluminescence data generally were gathered at different sites and on different days. Also included in table 1 are data on measurements made with the current reference method; these data are presented only for purposes of comparison and are not considered representative of actual nitrogen dioxide concentrations. Table 2 contains data derived from Saltzman measurements made by State and local agencies.

Comparison of the various data presented in tables 1 and 2, in light of the

results of EPA's reevaluation of the reference method, indicates that, in most locations, there were not substantial differences among the measurements made with the three methods, i.e., in most places, all measurements were below the national ambient air quality standard of 100 micrograms per cubic meter. In addition, based on limited data derived from measurements made where arsenite and Saltzman instruments were placed at the same sites, there appears to be a reasonable degree of correlation between measurements made with these two methods. These data are presented in table 3.

TABLE 1.—Nitrogen dioxide concentrations by various methods, 1972, for air quality control regions originally classified priority I¹

AQCR No.	AQCR name	Nitrogen dioxide concentration (micrograms per cubic meter) arithmetic average for period of operation			
		States	FRM ²	Arsenite ³	Chemiluminescent
014	Four Corners.....	Arizona-Colorado-Utah-New Mexico.....	47	30	.....
015	Phoenix-Tucson.....	Arizona.....	159	80	69
018	Memphis.....	Tennessee-Arkansas-Mississippi.....	118	64	31
021	Los Angeles.....	California.....	252	182	118
029	San Diego.....	do.....	136	63	76
030	San Francisco Bay Area ⁴	do.....	193	85	84
036	Denver ⁵	Colorado.....	106	42	110
042	Hartford-New Haven-Springfield.....	Connecticut-Massachusetts.....	125	82	73
043	New York-New Jersey-Connecticut.....	New York-New Jersey-Connecticut.....	182	100	65
045	Philadelphia.....	Pennsylvania-New Jersey-Delaware.....	197	83	84
047	National Capital ⁶	District of Columbia-Maryland-Virginia.....	146	88	64
050	Southeast Florida (Miami) ⁶	Florida.....	120	55	53
052	West Central Florida (Tampa).....	do.....	156	56	52
055	Chattanooga.....	Tennessee-Georgia.....	125	53	34
056	Atlanta.....	Georgia.....	153	80	62
067	Chicago ⁴	Illinois-Indiana.....	238	117	121
068	Dubuque.....	Iowa-Illinois-Wisconsin.....	70	30	23
070	St. Louis ⁴	Missouri-Illinois.....	123	79	58
078	Louisville.....	Kentucky-Indiana.....	184	87	68
079	Cincinnati.....	Ohio-Kentucky-Indiana.....	156	73	61
080	Indianapolis.....	Indiana.....	107	61	56
085	Omaha-Council Bluffs.....	Iowa-Nebraska.....	113	60	30
115	Baltimore.....	Maryland.....	159	96	64
118	Central Massachusetts (Worcester).....	Massachusetts.....	120	71	.....
119	Boston.....	do.....	132	74	.....
120	Providence.....	Rhode Island-Massachusetts.....	98	45	.....
122	Central Michigan (Grand Rapids).....	Michigan.....	127	59	44
123	Detroit-Port Huron.....	do.....	180	80	60
124	Toledo.....	Ohio-Michigan.....	139	54	38
131	Minneapolis-St. Paul.....	Minnesota.....	57	31	47
151	Northeast Pennsylvania-Upper Delaware Valley (Reading).....	Pennsylvania-New Jersey.....	158	52	60
160	Genesee-Finger Lakes (Rochester).....	New York.....	98	48	26
162	Niagara Frontier (Buffalo).....	do.....	76	32	49
173	Dayton.....	Ohio.....	158	64	53
174	Cleveland.....	do.....	126	57	53
176	Columbus.....	do.....	149	68	52
195	Central Pennsylvania (Johnston).....	Pennsylvania.....	25	64	.....
196	South Central Pennsylvania (Lancaster).....	do.....	132	60	36
197	Southwest Pennsylvania (Pittsburgh).....	do.....	177	78	64
214	Corpus Christi-Victoria.....	Texas.....	85	43	43
215	Dallas-Fort Worth.....	do.....	145	76	47
216	Houston-Galveston.....	do.....	137	64	66
220	Wasatch Front (Salt Lake City).....	Utah.....	159	62	114
223	Hampton Roads (Norfolk).....	Virginia.....	123	52	39
225	State Capital (Richmond).....	do.....	171	58	37
229	Puget Sound (Seattle).....	Washington.....	134	47	51
239	Southeast Wisconsin (Milwaukee).....	Wisconsin.....	124	76	.....

¹ For data on Clark-Mohave (Las Vegas) AQCR, see table 2.
² Federal reference method.
³ Arsenite data are corrected to reflect 85 percent collection efficiency. Available data indicate that there is 95 percent confidence that the corrected measurements are within ±10 percent of actual nitrogen dioxide concentrations.
⁴ All measurements at same site. In other AQCR's, all measurements were not made at the same site.
⁵ Originally classified priority III.
⁶ City names in parentheses are for identification only.

NOTE.—See appendix for information on site locations and numbers of days of operation.

PROPOSED RULES

TABLE 2.—Nitrogen dioxide concentrations in 1972 as reported by State and local agencies, Saltzman method

AQCR No.	Air quality control region	Average concentration micrograms per cubic meter
015	Phoenix-Tucson.....	80
030	San Francisco Bay Area.....	71
043	New York-New Jersey-Connecticut ¹	73
043	.....do.....	75
043	.....do.....	97
043	.....do.....	113
045	Philadelphia.....	66
045	.....do.....	79
047	National Capital.....	78
047	.....do.....	66
047	.....do.....	87
047	.....do.....	83
047	.....do.....	92
115	Baltimore.....	90
115	.....do.....	109
230	Wasatch Front.....	31
230	.....do.....	92
230	.....do.....	125
230	.....do.....	133
013	Clark-Mohave (Las Vegas).....	37

¹ Additional data from New York City show values ranging from 38 to 75 $\mu\text{g}/\text{m}^3$.

² 1971 data.

TABLE 3.—Relationship between arsenite and Saltzman methods¹

Station	Number of paired observations	Average nitrogen dioxide levels		Ratio of Saltzman to arsenite	Correlation coefficient
		Saltzman	Arsenite ²		
Chicago Camp ³	19	104	122	0.9	0.85
Cincinnati Camp.....	7	66	79	.8	.92
Denver Camp.....	8	76	90	.8	.85
Durham Camp ⁴	10	24	62	.4	.58
District of Columbia Camp.....	11	78	90	.9	.34
St. Louis Camp.....	23	82	84	1.0	.87
St. Louis No. 902 ¹	80	48	36	1.3	.75
Chattanooga No. 632.....	51	49	35	1.4	.76
Chattanooga No. 633.....	30	57	38	1.5	.66
California No. 841.....	36	111	57	1.9	.87
California No. 832.....	40	93	46	2.0	.71

¹ In the above table, correlation coefficients are reported for 11 sampling sites. 5 of the sites had a correlation of 0.85 or higher; 8 sites had a correlation of 0.71 or higher; and 10 of the 11 were above 0.5. A correlation of 0.70 or higher is quite acceptable when comparing results from 2 similar analytical methods. A correlation of 0.85 explains 72 percent of the total variation between any 2 variables being compared; a correlation of 0.71 explains more than 50 percent of the variation. Hence, it can be seen from the table that the methods correlate fairly well. There is no explanation available for the low correlation value noted for Washington, D.C. On the other hand, the 2 methods did not always agree on the exact level of nitrogen dioxide present. The Saltzman method often gave significantly higher values than the arsenite method; however, the lower readings given by the arsenite bubbler method are most likely the result of procedural difficulties at field sampling sites. This was checked for 2 California sites, and it was determined that the arsenite bubbler sampling system developed a leak. It could not be determined when the leak had occurred. Because of this problem, arsenite values at the 2 California sites are erroneously low. This accounts for the relatively high Saltzman-arsenite ratios at these sites. For the 2 Chattanooga sites, Durham, and St. Louis, the nitrogen dioxide values are below 50 $\mu\text{g}/\text{m}^3$. At this level, the Saltzman method is suspected of not being able to generate reliable results, and, therefore, close agreement between the methods may not be possible. It should be noted that at higher levels, especially at the range of the national ambient air quality standard, the 2 methods agree quite well. Obvious anomalous values were omitted in the development of this table.

² Corrected for 85 percent collection efficiency.

³ CAMP: Continuous air monitoring program/EPA.

⁴ Using Saltzman values above 18 $\mu\text{g}/\text{m}^3$. Saltzman method is not reliable at low levels of nitrogen dioxide, which accounts for the relatively low correlation at the Durham site.

⁵ Numbered sites are in EPA's community health environmental surveillance system.

Wherever all the available data indicate that nitrogen dioxide concentrations during 1972 were below the priority I cutoff point of 110 micrograms, EPA is proposing reclassification to priority III. Thus, 43 AQCR's would be reclassified. The Los Angeles and Chicago AQCR's are the only ones where all the data show nitrogen dioxide concentrations exceeding 110 micrograms; they would remain priority I. In the New York-New Jersey-Connecticut and Wasatch Front (Salt Lake City) AQCR's (originally priority I) and Denver AQCR (originally priority III), arsenite data show concentrations below the cutoff point, but chemiluminescence and/or Saltzman data show concentrations above it. Priority classifications for these three AQCR's would not be changed until more conclusive data are available; however, because the need for implementation of nitrogen oxides control measures in these AQCR's

is uncertain, States would not be required to take action at this time.

Based on the proposed reclassification, the Administrator is also proposing the following actions with respect to State implementation plans:

1. Revoke his previous disapproval of nitrogen oxides control strategy with respect to the State implementation plans for the air quality control regions listed in table 4 and withdraw proposed regulations dealing with control of stationary source emissions of nitrogen dioxide in these AQCR's.

2. Eliminate the requirement that the State of California's transportation control strategy for the San Francisco AQCR provide for attainment of the national standard for nitrogen dioxide; this AQCR is among those to be reclassified priority III. The transportation control strategy for this AQCR still will have to provide for attainment of the national standards

for carbon monoxide and photochemical oxidants.

3. As appropriate, alter the attainment date tables in notices of EPA action on State plans at 40 CFR Part 52 to indicate that nitrogen dioxide levels are already within the national standard.

Where States have adopted, and EPA has approved, regulations calling for control of nitrogen oxides emissions from stationary sources in AQCR's which would be reclassified priority III, EPA will entertain State requests for implementation plan revisions that would rescind such regulations. Such revisions would have to be made in accordance with 40 CFR 51.6.

REVISION OF SIP GUIDELINES

The proposed revisions to the nitrogen oxides control strategy requirements of the State implementation plan (SIP) guidelines are set forth elsewhere in this issue of the FEDERAL REGISTER.

NATIONAL AMBIENT AIR QUALITY STANDARD

The national standard for nitrogen dioxide is based largely on epidemiological studies of families of Chattanooga schoolchildren. 1-3 Because the measurement method used in these studies did not prove reliable, population exposures had to be reevaluated. Alternate measurements were available for 1967-68 from two U.S. Army continuous monitoring stations and from 10 continuous monitoring stations operated by the Public Health Service (PHS). Continuous recordings of nitrogen dioxide were taken by PHS, utilizing the colorimetric Saltzman method, from December 1967 through November 1968. The PHS data are reported in: "Chattanooga, Tennessee-Rossville, Georgia Interstate Air Quality Study 1967-1968" (U.S. Department of Health, Education, and Welfare, NAQA publication No. APTD-0583, 1970).

TABLE 4.—Air quality control regions affected by proposed revocation of NOX control strategy disapproval and proposed termination of EPA rulemaking

AQCR No.	AQCR name	Affected States
015	Phoenix-Tucson.....	Arizona.
042	Hartford-New Haven-Springfield.....	Massachusetts.
045	Philadelphia.....	Pennsylvania and New Jersey.
070	St. Louis.....	Missouri.
085	Omaha-Council Bluffs.....	Nebraska.
115	Baltimore.....	Maryland.
123	Detroit-Port Huron.....	Michigan.
151	Northeast Pennsylvania-Upper Delaware Valley.....	Pennsylvania.
160	Genesee-Finger Lakes.....	New York.
162	Niagara Frontier.....	Do.
195	Central Pennsylvania.....	Pennsylvania.
196	South Central Pennsylvania.....	Do.
197	Southwest Pennsylvania.....	Do.
214	Corpus Christi-Victoria.....	Texas.
215	Dallas-Fort Worth.....	Do.
216	Houston-Galveston.....	Do.
223	Hampton Roads.....	Virginia.
225	State Capital.....	Do.

REFERENCES

1. Shy, C. M., J. P. Creason, M. E. Pearlman, K. E. McClain, F. B. Benson, and M. M. Young. The Chattanooga schoolchildren study: Effects of com-

munity exposure to nitrogen dioxide. I. Methods, description of pollutant exposure, and results of ventilatory function testing. *J. Air Pol. Control Assn.*, 20: (8) 539, 1970.

2. Shy, C. M., J. P. Creason, M. E. Pearlman, K. E. McClain, F. B. Benson and M. M. Young. The Chattanooga schoolchildren study: Effects of community exposure to nitrogen dioxide. II. Incidence of acute respiratory illness. *J. Air Pol. Control Assn.*, 20: (9) 582, 1970.

3. Pearlman, M. E., J. F. Finklea, J. P. Creason, C. M. Shy, M. M. Young and R. J. M. Horton. Nitrogen dioxide and lower respiratory illness. *Pediatrics*, 40: 391, 1971.

As mentioned above, nitrogen dioxide measurements by the reference method cannot be assumed to reflect a constant 35 percent overall collection efficiency. Since this assumption was made for nitrogen dioxide measurements obtained using the reference method, as modified for the Chattanooga schoolchildren study, a reexamination of the data has been made. For this purpose, nitrogen dioxide concentrations obtained in Chattanooga during the 1968-69 health study were compared with nitrogen dioxide measurements obtained by the U.S. Army, which operated continuous monitors based on the Saltzman technique. These monitors ran simultaneously within 0.4 mile of one of the air monitoring stations established in the high nitrogen dioxide exposure area for the health study (school 1 of the Chattanooga schoolchildren study). The results of these measurements obtained from November 1968 through April 1969 (the period of the EPA health study) were as follows:

U.S. Army Instruments (Saltzman method) (parts per million) ¹		EPA health study (reference method) (parts per million)
No. 1	No. 2	
0.099	0.087	0.109

¹ 0.093 (average of 1 and 2).

These two results are not necessarily directly comparable, in view of the uncertainties introduced by the variable efficiency of the reference method. It should be apparent, however, that the nitrogen dioxide levels measured by the U.S. Army instruments provide a reasonable basis for the conclusion that the health effects observed in the study were indeed associated with a level approximately that indicated by the reference method.

The U.S. Army also collected nitric oxide and nitrogen dioxide data by the continuous Saltzman method at six sampling sites in Chattanooga during 1967 and 1968. Two of these sites were located in the high nitrogen dioxide exposure area of the Chattanooga health study. A comparison of means of hourly nitric oxide (NO) and nitrogen dioxide data is given below:

	Arithmetic mean (micrograms per cubic meter)		
	NO	NO ₂	NO/NO ₂
Site A.....	135	394	0.38
Site B.....	98	263	.37

Inspection of the data demonstrates that the ratio of nitric oxide to nitrogen dioxide in the air of the high nitrogen dioxide exposure areas is about .38. When this ratio is compared with the data available in the table entitled "Effect of NO on the Reference Method for NO₂" (see the discussion of EPA's reevaluation of the reference method elsewhere in this issue of the FEDERAL REGISTER), it is seen that at low nitrogen dioxide concentrations (approximately 100 µg/m³) the NO/NO₂ ratios observed in Chattanooga would have little effect on the apparent collection efficiency of nitrogen dioxide.

Nitrogen dioxide concentrations recorded by the PHS network were used to derive exposure isopleths for the Chattanooga area, which are independent of the data collected by the reference method. Based on the continuous monitoring data, concentration isopleths for the long-term average exposure (50th percentile of the frequency distribution), could be computed. Although health data were collected from November 1968 through April 1969 (the 6 months immediately following the period of air monitoring by the PHS), nitrogen dioxide exposures of the affected Chattanooga communities did not change over these two time periods. This conclusion was derived from data showing a constant rate of TNT production by the Volunteer Army Ammunition Plant (the main source of nitrogen dioxide exposure in the affected community) and the similarity of meteorological conditions in the two time periods.

Three adverse health effects were observed in the high nitrogen dioxide exposure communities of Chattanooga: Increased susceptibility to acute respiratory disease, increased severity of lower respiratory disease in children, and increased risk of chronic respiratory disease as manifested by reduced lung function in children. Repeated experimental animal studies corroborate the human findings and consistently demonstrate that nitrogen dioxide alone can impair the body's natural defenses to respiratory pathogens.

The reevaluation of nitrogen dioxide exposures in Chattanooga, using air monitoring data obtained by the continuous Saltzman method, was used to recalculate concentrations of nitrogen dioxide associated with adverse health effects. Based on this calculation, the annual average nitrogen dioxide concentration associated with adverse health effects was 150 micrograms per cubic meter (.08 parts per million).

The Clean Air Act requires that national primary ambient air quality standards include an adequate margin of safety to protect the health of the public. Based on the above analysis, the national standard for nitrogen dioxide ap-

pears to be fully consistent with this requirement of the act.

Current knowledge on health effects related to nitrogen dioxide does not, however, exclude the possibility that a short-term air quality standard may also be appropriate. Accordingly EPA is continuing to gather and evaluate relevant data and, if appropriate, will revise "Air Quality Criteria for Nitrogen Oxides" (U.S. Environmental Protection Agency, Publication No. AP-84, January 1971).

MOTOR VEHICLE EMISSION STANDARDS

Section 202(b) (1) (B) of the Clean Air Act requires the Administrator to establish a nitrogen oxides emission standard which, beginning with the 1976 model year, will result in a reduction of at least 90 percent from nitrogen oxides emission levels of 1971-model light-duty motor vehicles. The required standard was promulgated in June 1971. It established a limit of .4 grams-per-vehicle-mile.

While the general agreement that nitrogen dioxide is an air pollutant that can adversely affect public health, EPA's findings with respect to ambient air levels of nitrogen dioxide raise significant questions about the validity of the original justification for requirement of section 202(b) (1) (B).

To assess the relationship between motor vehicle emissions and air quality, EPA has made an analysis which compares the estimated air quality impact of retaining the existing 3.1 grams-per-mile emission standard vs. implementing the .4 grams-per-mile standard, beginning with the 1976 model year.

This analysis was done for 8 of the 10 AQCR's which currently have the highest ambient air levels of nitrogen dioxide. The ambient air concentrations of nitrogen dioxide used as the baseline for the analysis were those measured during 1972, with the arsenite method, as shown in table 1. Projected annual growth rates of nitrogen oxides emissions used for the analysis are shown in table 5. The assumptions made with respect to emission distribution and control of nitrogen oxides emissions from sources other than light-duty motor vehicles are shown in tables 6 and 7, respectively. It was assumed that there would be no major improvements in stationary source control, except with respect to electric generating plants, and that there would be an "intermediate" level of control (i.e., between existing standards and the most stringent standards likely to be attainable) of medium-duty and heavy-duty motor vehicles. Finally, it was assumed that there is a linear relationship between nitrogen oxides emissions and changes in ambient air concentrations of nitrogen dioxide.

The results of this analysis are summarized in table 8. As shown in table 8, it is estimated that, by 1985, the national ambient air quality standard for nitrogen dioxide, which is an annual average of 100 µg/m³ would be exceeded in three AQCR's if the existing emission standard is retained and in one AQCR if the 1976 standard is implemented. Thus, although the 0.4-gram-per-mile stand-

TABLE 6.—Emission distribution—Continued

Air quality control regions	Growth rate, percent per year				Total stationary sources
	Light-duty vehicles	Medium-duty vehicles	Heavy-duty vehicles	Powerplants	
Phoenix.....	2.7	2.7	2.7	5.1	5.8
Los Angeles.....	1.4	1.4	1.4	4.9	5.5
San Francisco.....	1.1	1.1	1.1	3.8	4.5
New York-New Jersey-Connecticut.....	.8	.8	.8	3.4	4.1
Philadelphia.....	1.2	1.2	1.2	3.5	4.4
National Capital.....	2.0	2.0	2.0	4.2	4.9
Chicago.....	2.2	2.2	2.2	4.2	4.9
Baltimore.....	5.7	5.7	5.7	3.6	4.6

TABLE 5.—Projected growth rates, nitrogen oxides emissions

Air quality control regions	Growth rate, percent per year				Total stationary sources
	Light-duty vehicles	Medium-duty vehicles	Heavy-duty vehicles	Powerplants	
Phoenix.....	2.7	2.7	2.7	5.1	5.8
Los Angeles.....	1.4	1.4	1.4	4.9	5.5
San Francisco.....	1.1	1.1	1.1	3.8	4.5
New York-New Jersey-Connecticut.....	.8	.8	.8	3.4	4.1
Philadelphia.....	1.2	1.2	1.2	3.5	4.4
National Capital.....	2.0	2.0	2.0	4.2	4.9
Chicago.....	2.2	2.2	2.2	4.2	4.9
Baltimore.....	5.7	5.7	5.7	3.6	4.6

TABLE 6.—Emission distribution

Air quality control regions	Growth rate, percent per year				Total stationary sources
	Light-duty vehicles	Medium-duty vehicles	Heavy-duty vehicles	Powerplants	
Phoenix.....	2.7	2.7	2.7	5.1	5.8
Los Angeles.....	1.4	1.4	1.4	4.9	5.5
San Francisco.....	1.1	1.1	1.1	3.8	4.5
New York-New Jersey-Connecticut.....	.8	.8	.8	3.4	4.1
Philadelphia.....	1.2	1.2	1.2	3.5	4.4
National Capital.....	2.0	2.0	2.0	4.2	4.9
Chicago.....	2.2	2.2	2.2	4.2	4.9
Baltimore.....	5.7	5.7	5.7	3.6	4.6

TABLE 7.—Projected nitrogen oxides emission ratios, 1972 base year

Year	Heavy-duty vehicles		Powerplants		Industrial		Area sources
	Medium-duty vehicles	Heavy-duty vehicles	New	Existing	New	Existing	
1975	1.0	1.0	0.82	1.0	0.97	1.0	1.0
1977	.98	.95	.63	.98	.97	.99	1.0
1980	.82	.80	.40	.79	.97	.97	1.0
1985	.58	.55	.40	.69	.85	.97	1.0
1990	.39	.36	.40	.69	.85	.95	1.0

NOTE.—Emission ratios reflect estimated percentage control relative to 1972 control of existing sources, i.e., 1972=1.0.

TABLE 8.—Predicted ambient air concentrations of nitrogen dioxide, micrograms per cubic meter, 1972 base year

Air quality control regions	Light-duty vehicle emissions 3.1 g/ml		Light-duty vehicle emissions 0.4 g/ml	
	1977	1980	1977	1980
Phoenix.....	83	83	77	67
Los Angeles.....	178	172	165	138
San Francisco.....	82	79	76	64
New York-New Jersey-Connecticut.....	97	93	91	76
Philadelphia.....	83	83	79	72
National Capital.....	87	83	87	80
Chicago.....	115	112	107	92
Baltimore.....	106	108	100	88

ard could be expected to produce some improvement over continuing the existing emission standards, only a small number of AQCR's would fail to maintain the national ambient air quality standard in either case.

In both cases, however, it was assumed that there would be no major improvement in control of stationary source emissions of nitrogen oxides, with the exception of emissions from electric generating plants and that no transportation control measures would be implemented. Since these factors can be expected to affect nitrogen dioxide levels, the estimates of the numbers of AQCR's exceeding the national ambient air quality standard are maximum estimates.

The Los Angeles AQCR is the only one which clearly would not meet the national standard in 1985 under the conditions of this analysis.

COMMENT

All interested parties are invited to submit written comments on any of the matters discussed herein and on the proposed regulations set forth below. Since classification of air quality control regions involves only a comparison between national ambient air quality standards and air quality measurements or estimates, rulemaking procedures ordinarily are not appropriate. In the course of the original classification of AQCR's, EPA consulted with the States prior to a final determination. The reclassification with respect to nitrogen dioxide is being proposed for comment because of the problems and uncertainties surrounding the methods which have been used to measure nitrogen dioxide. Under these circumstances, the Administrator has determined that, although proposal of the reclassification is not legally required, the rulemaking procedure is the most appropriate one available to insure careful consideration of the overall effect of EPA's actions by the States and the public.

Comments should be submitted, preferably in triplicate, to the Environmental Protection Agency, Office of Air Quality Planning and Standards, Control Programs Development Division, Research Triangle Park, N.C. 27711, Attention: Mr. Schueneman. All relevant comments received on or before July 23, 1973, will be considered. Comments received by EPA will be available for inspection during normal business hours at the Office of Public Affairs, 401 M Street SW., Washington, D.C. 20460. The regulations proposed herein, with appropriate modification, will be effective on republication in the FEDERAL REGISTER. This notice of proposed rulemaking is issued under the authority of section 110 of the Clean Air Act (42 U.S.C. 1859c-5).

Dated May 29, 1973.

ROBERT W. FRI,
Acting Administrator.

Subpart B—Alabama

§ 52.54 [Amended]

1. In § 52.54, the attainment date table is revised by replacing the letter "a", which designates the date for attainment of the national standard for nitrogen dioxide in the Metropolitan Birmingham intrastate region, with the letter "d".

Subpart D—Arizona

§ 52.121 [Amended]

2. In § 52.121, the table is revised by changing the classifications for nitrogen dioxide in the Clark-Mohave interstate and Phoenix-Tucson intrastate regions from "I" to "III", and in the Four Corners interstate region from "IA" to "III".

§ 52.127 [Revoked]

3. Section 52.127 is revoked.

§ 52.131 [Amended]

4. In § 52.131, the attainment date table is revised by replacing the letter "a", which designates the date for at-

tainment of the national standard for nitrogen dioxide in the Phoenix-Tucson intrastate region, with the letter "c".

Subpart E—Arkansas

§ 52.171 [Amended]

5. In § 52.171, the table is revised by changing the classification for nitrogen dioxide in the Metropolitan Memphis interstate region from "I" to "III".

§ 52.176 [Amended]

6. In § 52.176, the attainment date table is revised by replacing the letter "a," which designates the date for attainment of the national standard for nitrogen dioxide in the Metropolitan Memphis interstate region, with the letter "c".

Subpart F—California

§ 52.221 [Amended]

7. In § 52.221, the table is revised by changing the classifications for nitrogen dioxide in the San Francisco Bay area and the San Diego intrastate regions from "I" to "III".

§ 52.230 [Amended]

8. Section 52.230(b) is revoked.

§ 52.238 [Amended]

9. In § 52.238, the attainment date table is revised by replacing the date "May 31, 1975, f" for attainment of the national standard for nitrogen dioxide in the San Francisco Bay intrastate region, and by replacing the letter "a," which designates the date for attainment of the national standard for nitrogen dioxide in the San Diego intrastate region, with the letter "e".

10. Section 52.239 is revised to read as follows:

§ 52.239 Transportation and land-use controls.

(a) To complete the requirements of §§ 51.11(b) and 51.14 of this chapter, the Governor of California must submit to the Administrator:

(1) No later than April 15, 1973, transportation and/or land-use control strategies and a demonstration that said strategies, along with California's presently adopted stationary source emission limitations for carbon monoxide and hydrocarbons and the Federal motor vehicle control program, will attain and maintain the national standards for carbon monoxide and photochemical oxidants (hydrocarbons) in the San Francisco Bay area, Metropolitan Los Angeles, San Diego, Sacramento Valley, and San Joaquin Valley intrastate regions and the national standard for photochemical oxidants (hydrocarbons) in the southeast desert intrastate region by May 31, 1975. By such date (Apr. 15, 1973), the State also must submit a detailed timetable for implementing the legislative authority, regulations, and administrative policies required for carrying out the transportation and/or land-use control strategies by May 31, 1975.

(2) No later than July 30, 1973, the legislative authority that is needed for carrying out such strategies.

(3) No later than December 30, 1973, the necessary adopted regulations and administrative policies needed to implement such strategies.

Subpart G—Colorado

§ 52.321 [Amended]

11. In § 52.321, the table is revised by changing the classification for nitrogen dioxide in the Four Corners interstate region from "IA" to "III".

§ 52.325 [Amended]

12. In § 52.325, the attainment date table is revised by replacing the letter "a", which designates the date for attainment of the national standard for nitrogen dioxide in the Four Corners interstate region, with the letter "d".

Subpart H—Connecticut

§ 52.371 [Amended]

13. In § 52.371, the table is revised by changing the classification for nitrogen dioxide in the Hartford-New Haven-Springfield interstate region from "I" to "III".

§ 52.374 [Amended]

14. In § 52.374, the attainment date table is revised by replacing the date "June 1975" for attainment of the national standard for nitrogen dioxide in the Hartford-New Haven-Springfield interstate region with the letter "c".

Subpart I—Delaware

§ 52.421 [Amended]

15. In § 52.421, the table is revised by changing the classification for nitrogen dioxide in the Metropolitan Philadelphia interstate region from "I" to "III".

§ 52.428 [Amended]

16. In § 52.428, the attainment date table is revised by replacing the date "January 1974" for attainment of the national standard for nitrogen dioxide in the Metropolitan Philadelphia interstate region with the letter "a".

Subpart J—District of Columbia

§ 52.471 [Amended]

17. In § 52.471, the table is revised by changing the classification for nitrogen dioxide in the National Capital interstate region from "I" to "III".

§ 52.481 [Amended]

18. In § 52.481, the attainment date table is revised by replacing the date "July 1975" for attainment of the national standard for nitrogen dioxide in the National Capital interstate region with the letter "a" and by adding footnote "a" to read as follows:

a. Air quality levels presently below secondary standard.

Subpart K—Florida

§ 52.521 [Amended]

19. In § 52.521, the table is revised by changing the classifications for nitrogen dioxide in the West Central Florida and Southeast Florida intrastate regions from "I" to "III".

§ 52.523 [Amended]

20. In § 52.523, the attainment date table is revised by replacing the letter "a", which designates the date for attainment of the national standard for nitrogen dioxide in the West Central Florida and the Southeast Florida intrastate regions, with the letter "c".

Subpart L—Georgia

§ 52.571 [Amended]

21. In § 52.571, the table is revised by changing the classifications for nitrogen dioxide in the Metropolitan Atlanta intrastate and Chattanooga interstate regions from "I" to "III".

§ 52.757 [Amended]

22. In § 52.757, the attainment date table is revised by replacing the letter "a", which designates the date for attainment of the national standard for nitrogen dioxide in the Metropolitan Atlanta intrastate and the Chattanooga interstate regions, with the letter "c".

Subpart O—Illinois

§ 52.721 [Amended]

23. In § 52.721, the table is revised by changing the classification for nitrogen dioxide in the Metropolitan St. Louis (Missouri-Illinois) Interstate Region from "I" to "III", and in the Metropolitan Dubuque interstate region from "IA" to "III".

§ 52.727 [Amended]

24. In § 52.727, the attainment date table is revised by replacing the date "July 1975" for attainment of the national standard for nitrogen dioxide in the Metropolitan Dubuque and the Metropolitan St. Louis (Missouri-Illinois) interstate regions with the letter "c".

Subpart P—Indiana

§ 52.771 [Amended]

25. In § 52.771, the table is revised by changing the classifications for nitrogen dioxide in the Louisville and Metropolitan Cincinnati interstate regions and the Metropolitan Indianapolis intrastate region from "I" to "III".

§ 52.783 [Amended]

26. In § 52.783, the attainment date table is revised by replacing the letter "a", which designates the date for attainment of the national standard for nitrogen dioxide in the Louisville and the Metropolitan Cincinnati Interstate Regions and in the Metropolitan Indianapolis intrastate region, with the letter "e".

Subpart Q—Iowa

§ 52.821 [Amended]

27. In § 52.821, the table is revised by changing the classifications for nitrogen dioxide in the Metropolitan Omaha-Council Bluffs and Metropolitan Dubuque interstate regions from "I" to "III".

§ 52.827 [Amended]

28. In § 52.827, the attainment date table is revised by replacing the letter

"a", which designates the date for attainment of the national standard for nitrogen dioxide in the Metropolitan Omaha-Council Bluffs and the Metropolitan Dubuque interstate regions, with the letter "c".

Subpart S—Kentucky

§ 52.921 [Amended]

29. In § 52.921, the table is revised by changing the classifications for nitrogen dioxide in the Louisville and Metropolitan Cincinnati interstate regions from "I" to "III".

§ 52.926 [Amended]

30. In § 52.926, the attainment date table is revised by replacing the letter "a", which designates the date for attainment of the national standard for nitrogen dioxide in the Louisville and the Metropolitan Cincinnati interstate regions, with the letter "c".

Subpart V—Maryland

§ 52.1071 [Amended]

31. In § 52.1071, the table is revised by changing the classifications for nitrogen dioxide in the Metropolitan Baltimore intrastate and National Capital interstate regions from "I" to "III".

§ 52.1075 [Revoked]

32. Section 52.1075 is revoked.

§ 52.1078 [Amended]

33. In § 52.1078, the attainment date table is revised by replacing the letter "a," which designates the date for attainment of the national standard for nitrogen dioxide in the Metropolitan Baltimore intrastate and the National Capital interstate regions, with the letter "d."

Subpart W—Massachusetts

§ 52.1121 [Amended]

34. In § 52.1121, the table is revised by changing the classifications for nitrogen dioxide in the Metropolitan Boston and central Massachusetts intrastate regions and the Metropolitan Providence and Hartford-New Haven-Springfield interstate regions from "I" to "III".

§ 52.1124 [Revoked]

35. Section 52.1124 is revoked.

§ 52.1127 [Amended]

36. In § 52.1127, the attainment date table is revised by replacing "a" for attainment of the national standard for nitrogen dioxide in the Metropolitan Boston and the central Massachusetts intrastate regions and the Hartford-New Haven-Springfield interstate regions with the letter "e."

Subpart X—Michigan

§ 52.1171 [Amended]

37. In § 52.1171, the table is revised by changing the classifications for nitrogen dioxide in the Metropolitan Detroit-Port Huron and Central Michigan intrastate regions and the Metropolitan Toledo interstate region from "I" to "III".

§ 52.1174 [Revoked]

38. Section 52.1174 is revoked.

§ 52.1177 [Amended]

39. In § 52.1177, the attainment date table is revised by replacing the letter "a", which designates the date for attainment of the national standard for nitrogen dioxide in the Metropolitan Detroit-Port Huron and the Central Michigan intrastate region and in the Metropolitan Toledo interstate region, with the letter "c".

Subpart Y—Minnesota

§ 52.1221 [Amended]

40. In § 52.1221, the table is revised by changing the classification for nitrogen dioxide in the Minneapolis-St. Paul intrastate region from "I" to "III".

§ 52.1226 [Amended]

41. In § 52.1226, the attainment date table is revised by replacing the letter "a", which designates the date for attainment of the national standard for nitrogen dioxide in the Minneapolis-St. Paul intrastate region, with the letter "d".

Subpart Z—Mississippi

§ 52.1271 [Amended]

42. In § 52.1271, the table is revised by changing the classification for nitrogen dioxide in the Metropolitan Memphis interstate region from "I" to "III".

§ 52.1273 [Amended]

43. In § 52.1273, the attainment date table is revised by replacing the date "June 1975" for attainment of the national standard for nitrogen dioxide in the Metropolitan Memphis interstate region with the letter "b".

Subpart AA—Missouri

§ 52.1321 [Amended]

44. In § 52.1321, the table is revised by changing the classification for nitrogen dioxide in the Metropolitan St. Louis interstate region from "I" to "III".

§ 52.1326 [Revoked]

45. Section 52.1326 is revoked.

§ 52.1332 [Amended]

46. In § 52.1332, the attainment date table is revised by replacing the letter "a", which designates the date for attainment of the national standard for nitrogen dioxide in the Metropolitan St. Louis interstate region, with the letter "c".

Subpart CC—Nebraska

§ 52.1421 [Amended]

47. In § 52.1421, the table is revised by changing the classification for nitrogen dioxide in the Metropolitan Omaha-Council Bluffs interstate region from "I" to "III".

§ 52.1431 [Amended]

48. In § 52.1431, the attainment date table is revised by replacing the letter "a", which designates the date for attainment of the national standard for nitrogen dioxide in the Metropolitan

Omaha-Council Bluffs Interstate region, with the letter "c".

§ 52.1433 [Revoked]

49. Section 52.1433 is revoked.

Subpart DD—Nevada

§ 52.1471 [Amended]

50. In § 52.1471, the table is revised by changing the classification for nitrogen dioxide in the Clark-Mohave Interstate region from "I" to "III".

Subpart FF—New Jersey

§ 52.1571 [Amended]

51. In § 52.1571, the table is revised by changing the classifications for nitrogen dioxide in the Metropolitan Philadelphia and Northeast Pennsylvania-Upper Delaware Valley Interstate regions from "I" to "III".

§ 52.1576 [Amended]

52. Section 52.1576 is revised to delete the references to the Metropolitan Philadelphia and Northeast Pennsylvania-Upper Delaware Valley Interstate regions.

§ 52.1580 [Amended]

53. In § 52.1580, the attainment date table is revised by replacing the letter "a", which designates the date for attainment of the national standard for nitrogen dioxide in the New Jersey-New York-Connecticut, Metropolitan Philadelphia and the Northeast Pennsylvania-Upper Delaware Valley Interstate regions, with the letter "d".

Subpart GG—New Mexico

§ 52.1621 [Amended]

54. In § 52.1621, the table is revised by changing the classification for nitrogen dioxide in the Four Corners Interstate region from "IA" to "III".

Subpart HH—New York

§ 52.1671 [Amended]

55. In § 52.1671, the table is revised by changing the classifications for nitrogen dioxide in the Niagara Frontier and Genesee-Finger Lakes intrastate regions from "I" to "III".

§ 52.1676 [Amended]

56. Section 52.1676 is revised to delete any reference to the Niagara Frontier and Genesee-Finger Lakes intrastate regions.

§ 52.1682 [Amended]

57. In § 52.1682, the attainment date table is revised by replacing the date "July 1975" for attainment of the national standard for nitrogen dioxide in the Niagara Frontier and the Genesee-Finger Lakes intrastate regions with the letter "e".

Subpart KK—Ohio

§ 52.1871 [Amended]

58. In § 52.1871, the table is revised by changing the classifications for nitrogen dioxide in the Greater Metropolitan Cleveland, Metropolitan Columbus and the Metropolitan Dayton intrastate re-

gions and the Metropolitan Cincinnati and Metropolitan Toledo interstate regions from "I" to "III".

§ 52.1875 [Amended]

59. In § 52.1875, the attainment date table is revised by replacing the letter "a", which designates the date for attainment of the national standard for nitrogen dioxide in the Greater Metropolitan Cleveland, Metropolitan Columbus, and the Metropolitan Dayton intrastate regions and in the Metropolitan Cincinnati and the Metropolitan Toledo interstate regions, with the letter "e".

Subpart MM—Oregon

§ 52.1973 [Amended]

60. In § 52.1973, the attainment date table is revised by replacing the date "May, 1975" for attainment of the national standard for nitrogen dioxide in the Portland Interstate region with the letter "b".

Subpart NN—Pennsylvania

§ 52.2021 [Amended]

61. In § 52.2021, the table is revised by changing the classifications for nitrogen dioxide in the Metropolitan Philadelphia and Northeast Pennsylvania-Upper Delaware Valley Interstate regions and in the South Central Pennsylvania, Central Pennsylvania and the Southwest Pennsylvania intrastate regions from "I" to "III".

§ 52.2027 [Revoked]

62. Section 52.2027 is revoked.

§ 52.2034 [Amended]

63. In § 52.2034, the attainment date table is revised by replacing the letter "a", which designates the date for attainment of the national standard for nitrogen dioxide in the Metropolitan Philadelphia and the Northeast Pennsylvania-Upper Delaware Valley Interstate regions and in the South Central Pennsylvania, Central Pennsylvania, and the Southwest Pennsylvania intrastate regions, with the letter "e".

Subpart OO—Rhode Island

§ 52.2071 [Amended]

64. In § 52.2071, the table is revised by changing the classification for nitrogen dioxide in the Metropolitan Providence Interstate Region from "I" to "III".

§ 52.2076 [Amended]

65. In § 52.2076, the attainment date table is revised by replacing the letter "a", which designates the date for attainment of the national standard for nitrogen dioxide in the Metropolitan Providence Interstate Region with the letter "b".

Subpart RR—Tennessee

§ 52.2221 [Amended]

66. In § 52.2221, the table is revised by changing the classifications for nitrogen dioxide in the Chattanooga and Metropolitan Memphis Interstate Regions from "I" to "III".

§ 52.2230 [Amended]

67. In § 52.2230, the attainment date table is revised by replacing the letter "a", which designates the date for attainment of the national standard for nitrogen dioxide in the Chattanooga and the Metropolitan Memphis Interstate Regions, with the letter "c".

Subpart SS—Texas

§ 52.2271 [Amended]

68. In § 52.2271, the table is revised by changing the classifications for nitrogen dioxide in the Corpus Christi-Victoria, Metropolitan Houston-Galveston, and the Metropolitan Dallas-Fort Worth Intrastate Regions from "I" to "III".

§ 52.2276 [Revoked]

69. Section 52.2276 is revoked.

§ 52.2279 [Amended]

70. In § 52.2279, the attainment date table is revised by replacing the letter "a", which designates the date for attainment of the national standard for nitrogen dioxide in the Corpus Christi-Victoria, Metropolitan Houston-Galveston, and the Metropolitan Dallas-Fort Worth Intrastate Regions, with the letter "b".

Subpart TT—Utah

§ 52.2321 [Amended]

71. In § 52.2321, the table is revised by changing the classifications for nitrogen dioxide in the Four Corners Interstate Region from "IA" to "III".

§ 52.2331 [Amended]

72. In § 52.2331, the attainment date table is revised by replacing the letter "a", which designates the date for attainment of the national standard for nitrogen dioxide in the Four Corners Interstate Region, with the letter "c".

Subpart VV—Virginia

§ 52.2421 [Amended]

73. In § 52.2421, the table is revised by changing the classifications for nitrogen dioxide in the State Capital and Hampton Roads Intrastate Regions and the National Capital Interstate Region from "I" to "III".

§ 52.2426 [Revoked]

74. Section 52.2426 is revoked.

§ 52.2429 [Amended]

75. In § 52.2429, the attainment date table is revised by replacing the letter "a", which designates the date for attainment of the national standard for nitrogen dioxide in the State Capital and the Hampton Roads Intrastate Regions, and by replacing the date "June, 1975" for attainment of the national standard for nitrogen dioxide in the National Capital Interstate Region with the letter "d".

Subpart WW—Washington

§ 52.2471 [Amended]

76. In § 52.2471, the table is revised by changing the classification for nitrogen dioxide in the Puget Sound Intrastate Region from "I" to "III".

PROPOSED RULES

APPENDIX A—TABLE A-1—Continued
AQCR RECLASSIFICATION STUDY—24-HOUR INTEGRATED NO₂ DATA—Continued

AQCR No.	AQCR name, State, and site	Sampling location	Reference		Arsenite	
			Average (microgram per cubic meter)	Number	Average (microgram per cubic meter)	Number
024	Metro Los Angeles, California:					
	Anaheim.....	1010 South Harbor Blvd.	329	20	141	29
	Glendale.....	145 North Howard St.	245	24	144	27
	Long Beach.....	2655 Pine Ave.	190	25	122	24
	Los Angeles.....	434 South San Pedro St.	252	27	182	28
	Pasadena.....	Keck Laboratory, California Institute of Technology	176	26	118	23
	San Bernardino.....	172 West 3d St.	182	25	103	25
	Santa Ana.....	645 North Ross St.	194	27	112	29
	Torrance.....	2904 Carson Blvd.	171	27	68	28
028	Sacramento Valley, California, Sacramento.	2221 Stockton Blvd.	95	25	61	25
029	San Diego, California, San Diego.	820 E St.	136	27	63	27
030	San Francisco Bay Area, California:	State Department, Public Health.	76	25	54	27
	Oakland.....	409 3th St.	100	26	76	26
	San Francisco.....	142 Broadway St.	142	23	70	30
	San Jose.....	104 West Alhambra St.	103	23	85	29
031	San Joaquin Valley, California, Fresno.	2314 Mariposa and M Sts.	124	28	50	23
036	Metro Denver, Colorado:					
	Denver.....	414 14th St.	73	22	75	19
	Harford-New Haven-Springfield (Connecticut):	2105 Broadway.	106	28	42	26
042	Harford-New Haven-Springfield (Connecticut):					
	Harford.....	10 Clinton St.	136	11	75	12
	New Haven.....	270 Orange St.	159	28	38	28
	Springfield.....	East Columbia Ave.	125	22	82	21
043	New Jersey-New York-Connecticut:					
	Connecticut, Bridgeport.....	274 Middle St.	171	30	73	29
	New Jersey, Elizabeth.....	35 Morrel St.	174	21	52	22
	New York, New York, Manhattan.....	Compelson Ave.	188	23	81	23
	New York, New York, Newark.....	920 Broad St.	137	22	21	24
	New York, New York, Paterson.....	25 Mill St.	84	16	38	15
	New York, New York, Waterbury.....	170 East 121st St.	182	29	100	28
044	Northwest Connecticut, Connecticut, Waterbury.	235 Grand Ave.	144	29	49	29
045	Metro Philadelphia, Delaware:					
	Newark.....	521 South College Ave.	73	28	42	25
	Wilmington.....	Walnut and Taylor Sts.	151	29	69	28
	New Jersey, Camden.....	Fire Station Headquarters 3d and Arch Sts.	76	23	38	22
	New Jersey, Camden.....	2102 Harrison Park	75	25	37	25
	Camden County.....	Glassboro State College.	62	27	27	30
	Glassboro.....	State House Annex, State St.	82	27	44	28
	Trenton.....	3300 Frankford Ave.	191	28	80	29
	Pennsylvania:	2031 Race St.	107	14	41	15
	Philadelphia.....	Philadelphia Camp.	42	30	21	29
046	Southern Delaware, Delaware, Kent County.	Bombay Block NWA (Smayna).	113	17	77	14
047	National Capital, D.C.:					
	Washington.....	301 Indiana Ave. NW.	147	27	88	26
	Washington Camp.....	427 New Jersey Ave. NW.	104	25	60	24
049	Jacksonville-Brunswick, Florida, Jacksonville.	Monroe St. (between Laura and Hogas Sts.)	140	25	60	24
050	Southeast Florida, Florida, Miami.	864 NW 23d St.	120	26	55	27

§ 52.2577 [Amended]

79. In § 52.2577, the attainment date table is revised by replacing the letter "a", which designates the date for attainment of the national standard for nitrogen dioxide in the Southeastern Wisconsin Intrastate Region and in the Metropolitan Dubuque Interstate Region, with the letter "c".

Note.—AQCR reclassification study also included the following Saltzman data (micrograms per cubic meter):

	Average	Number of days
036 Metro-Denver.....	73	270
047 National Capital.....	89	180
067 Metro-Chicago.....	105	311
070 Metro-St. Louis.....	86	244

§ 52.2478 [Amended]

77. In § 52.2478, the attainment date table is revised by replacing the date "July 1975" for attainment of the national standard for nitrogen dioxide in the Puget Sound Intrastate Region with the letter "b".

Subpart YY—Wisconsin

§ 52.2371 [Amended]

78. In § 52.2371, the table is revised by changing the classifications for nitrogen dioxide in the Southeastern Wisconsin Intrastate Region from "I" to "III", and in the Metropolitan Dubuque Interstate Region from "IA" to "III".

APPENDIX A—TABLE A-1

AQCR RECLASSIFICATION STUDY—21-HOUR INTEGRATED NO₂ DATA

AQCR No.	AQCR name, State, and site	Sampling location	Reference		Arsenite	
			Average (microgram per cubic meter)	Number	Average (microgram per cubic meter)	Number
002	Columbus-Phenix City:					
	Alabama, Montgomery.....	515 West Jefferson Davis Highway.	49	30	30	2.0
	Georgia, Columbus.....	1938 8th Ave.	87	25	50	27
004	Metro Birmingham, Alabama, Birmingham.	720 South 20th St.	140	29	64	28
005	Mobile-Pensacola-Panama City-South-ern Mississippi:					
	Alabama, Mobile.....	701 St. Francis St.	55	22	55	23
	Mississippi.....	426 North State St.	87	22	43	23
	Jackson County.....	Research Lab., Ocean Springs.	37	23	21	24
	Jackson County.....	Route No. 6, Crossville.	18	10	11	12
007	Tennessee River Valley-Cumberland Mountains, Tennessee, Cumberland County.	Post Office, 3d and Cushman.	90	11	47	11
009	Northern Alaska, Alaska, Fairbanks.	Grand Canyon Village Reg.	20	10	16	12
014	Four Corners:					
	Arizona, Grand Canyon.....	620 South Lake Rd.	47	7	30	10
	New Mexico: Farmington, No. 1.....	620 South Lake Rd.	39	11	17	11
015	Phoenix-Tucson, Arizona:					
	Phoenix.....	1825 East Roosevelt St.	159	30	80	29
	Tucson.....	University of Arizona, 2d and Palm.	71	24	49	23
016	Central Arkansas, Arkansas, Little Rock.	700 West Markham.	89	23	39	24
017	Metro Fort Smith, Oklahoma, Cherokee County.	Cherokee County Health Department.	31	26	18	26
018	Metro Memphis, Tennessee, Memphis.	814 Jefferson St.	148	30	64	30
019	Monroe-El Dorado, Arkansas, El Dorado.	Post Office, Main and Jackson.	68	8	51	8
022	Shreveport-Texarkana-Tyler, Louisiana, Shreveport.	1866 King Highway.	92	29	47	26

See footnotes end of table.

APPENDIX A—TABLE A-1—Continued
 AQR RECLASSIFICATION STUDY—24-HOUR INTEGRATED NO_x DATA—Continued

AQR No.	AQR name, State, and site	Reference		Arsenite		
		Average (microgram per cubic meter)	Number			
052	West Central Florida, Florida: Hardee Company	39	25	20	27	2.3
	Pioneer Park, Zolfo Springs					
	500 7th Ave., South Tampa	26	34	27	27	1.5
	315 East Kennedy Blvd.	27	56	26	3.4	
055	Chattanooga, Tennessee, Chattanooga	23	53	25	25	2.5
	9th St. and Georgia Ave.					
056	Metropolitan Atlanta, Georgia, Atlanta	29	80	29	27	2.7
	90 Butler St. SE					
058	Savannah-Beaufort, Georgia, Savannah	77	26	45	28	2.1
	Court House, Bull and Bay Sts.					
060	Hawaii, Hawaii: Hawaii County No. 1	23	13	13	18	2.9
	Mauna Loa Volcano, Observatory (Hilo)					
056	Hawaii County No. 2	32	24	19	26	2.3
	Mauna Loa Volcano, Observatory (Hilo)					
062	Hawaii County No. 3	30	27	17	24	2.1
	Hawaii Volcanoes National Park					
062	Honolulu, Hawaii: Eastern Washington-Northern Idaho	107	27	53	25	2.5
	1250 Punch Bowl St.					
065	Burlington-Keokuk, Illinois, Peoria	90	26	53	27	2.1
	445 South Plymouth Court					
067	Metro Chicago: Chicago	97	27	68	22	1.8
	320 North Clark St.					
	445 South Plymouth Court					
105	Chicago Camp	105	29	53	30	2.3
238	Chicago Camp	238	28	117	27	2.4
	Indiana: East Chicago	137	24	68	24	2.3
	450 East Columbus Dr.					
	3600 West 3d St.	136	30	80	28	2.1
	Hammond	169	27	27	23	2.3
068	Metro Dubuque, Iowa, Dubuque	69	26	30	25	2.9
	Engine House 9th and Iowa					
070	Metro St. Louis, Missouri: St. Louis	87	24	39	24	2.5
	18th and Market St.					
	St. Louis Camp	123	29	79	28	1.9
073	Rockford - Jansenville - Beloit, Illinois, Rockford	106	20	53	20	2.2
	215 South 12th Blvd.					
	126 South First St.					
077	Evansville - Owensboro - Henderson, Indiana, Evansville	101	25	54	24	2.3
	1065 West Penn St.					
078	Louisville, Kentucky, Louisville	34	29	12	28	3.4
	City-County Building	184	20	57	20	2.5
	2600 South 3d St.					
079	Metro Cincinnati: Cincinnati	144	27	71	28	2.5
	7th and Scott					
	500 Vine St.	156	29	73	29	2.5
	Central Ave. and Ann St.	142	29	41	28	4.3
	Cincinnati Camp					
080	Metro Indianapolis, Indiana, Indianapolis	107	24	61	22	2.2
	301 East New York St.					
081	Northeast Indiana, Indiana, Fort Wayne	86	25	53	26	1.8
	Public Health, Main Street					
082	South Bend-Elkhart-Benton Harbor, Indiana, South Bend	98	25	72	23	1.8
	122 West Wayne					
083	Central Indiana, Indiana, Monroeville	49	24	20	23	3.0
	Route 3, Martinsville					
085	Metro Omaha-Council Bluffs, Nebraska, Omaha	113	29	60	30	2.3
	City Hall, 18th and Farber Sts.					
092	South Central Iowa, Iowa, Des Moines	99	27	88	30	2.0
	Station No. 1, 9th and Mulberry					
094	Metro Kansas City: Kansas, Kansas City	75	28	62	27	1.7
	Miami St. and Baltimore Ave.					
	1617 Locust	99	13	47	10	2.8

APPENDIX A—TABLE A-1—Continued
 AQR RECLASSIFICATION STUDY—24-HOUR INTEGRATED NO_x DATA—Continued

AQR No.	AQR name, State, and site	Reference		Arsenite		
		Average (microgram per cubic meter)	Number			
065	Northeast Kansas, Kansas, Topeka	44	27	38	20	1.5
	216 East Seventh St.					
069	South Central Kansas, Kansas, Wichita	57	26	35	27	2.0
	402 North Water					
102	Bluegrass, Kentucky, Lexington	94	21	52	23	2.2
105	South Central Kentucky, Kentucky, Bowling Green	68	22	50	22	1.7
106	Southern Louisiana-Southeast Texas: Louisiana: Rouge	116	28	48	27	3.1
	1819 Florida St.					
	Baton Rouge, La. State	64	25	37	27	2.1
	NF. Oued Campus	150	27	72	27	2.5
	New Orleans	92	24	46	28	2.5
	Texas, Beaumont	37	22	20	22	2.3
107	Androssogin Valley, New Hampshire, Coos County	42	26	14	29	3.2
	Mountaint National Forest					
109	Down East, Maine, Acadia National Park	169	29	96	30	2.1
115	Metro Baltimore, Maryland, Baltimore	82	25	25	24	2.5
116	Southern Maryland, Maryland, Calvert	119	26	70	28	2.1
118	County, Massachusetts, Massachusetts, Whitaker	132	17	74	18	2.0
119	Metro Boston, Massachusetts: Boston	125	18	62	19	2.3
	J. F. K. Building					
	Government Center	80	8	38	10	2.8
120	Metro Providence: Massachusetts, New Bedford	98	26	45	28	2.6
	133 Williams St.					
	Providence	43	29	20	20	2.6
	Washington County	128	27	61	28	2.5
122	Central Michigan, Michigan: Flint	127	27	69	26	2.6
	Detroit St. and 4th Ave.					
	830 Ottawa Ave.	90	27	53	28	2.1
	Saginaw					
123	Metro Detroit-Port Huron, Michigan: Dearborn	131	25	68	27	2.4
	4500 Maple Ave.					
	Detroit	180	30	80	29	2.7
	6201 Woodward Ave.	139	27	55	27	2.9
124	Metro Toledo, Ohio, Toledo	132	27	67	28	2.4
125	South Central Michigan, Michigan, Lansing	91	26	49	25	2.3
	120 East Shilawassee					
129	Duluth-Superior, Minnesota, Duluth	57	28	31	28	2.6
131	Minnesota-St. Paul, Minnesota: Minneapolis	138	28	51	29	3.2
	717 Delaware SE					
	100 East 10th St.					
136	Northern Piedmont, North Carolina: Greensboro	51	29	31	28	2.0
	209 South Davie St.					
139	Southwest Missouri, Missouri, Shannon County	74	22	45	23	1.9
	Fire Control Tower, Highway 19					
141	Great Falls, Montana, Glacier Peak	24	27	14	24	2.2
	St. Mary Ranger Station					
145	Lincoln-Beatrice-Fairbury, Nebraska, Lincoln	51	25	28	26	2.3
	1432 North St.					
146	Nebraska, Nebraska, Thomas County	28	13	11	14	3.2
	Bessex Nursery Nebraska National Forest					
151	Northeast Pennsylvania-Upper Delaware Valley, Pennsylvania: Allentown	57	28	33	28	2.1
	635 Linden St. and 435 Hamilton					
	Reading	158	39	52	25	3.5
	8th and West St.	80	22	78	26	1.2
	Scranton					
	Washington and Mulberry St.					
152	Albuquerque-Mid Rio Grande, New Mexico, Albuquerque	97	24	44	21	2.7
	200 Block A and Tijeras Ave.					
153	El Paso-Las Cruces-Alamogordo, Texas, El Paso	104	25	42	23	3.0
	118 West Missouri					

PROPOSED RULES

APPENDIX A—TABLE A-1—Continued
AQCR RECLASSIFICATION STUDY—24-HOUR INTEGRATED NO_x DATA—Continued

AQCR No.	AQCR name, State, and site	Sampling location	Reference		Ratio to reference ²	Arsenite	
			Average (microgram per cubic meter)	Number		Average (microgram per cubic meter)	Number
168	Central New York, New York: Jefferson County.....	Tibbetts Point Lido Station.....	51	28	2.2	29	2.9
		101 North Beech St.....	99	23	1.8	26	1.8
		406 Elizabeth St.....	111	27	2.3	30	2.3
169	Genesee-Finger Lakes, New York.....	183 North St.....	98	30	2.4	30	2.4
161	Hudson Valley, New York, Albany.....	81 Holland Ave.....	120	28	2.7	28	2.7
162	Niagara Frontier, New York: Buffalo.....	Museum Natural Science, Humbolt Parkway.....	73	21	2.8	25	2.8
		Niagara Falls.....					
166	Eastern Piedmont, North Carolina.....	Main St. and Cedar Ave.....	103	28	2.0	28	2.0
		300 East Main St.....	61	26	1.7	25	1.7
167	Metro Charlotte, North Carolina.....	600 East Trade St.....	74	28	2.3	27	2.3
168	Charlotte, Central Plath, North Carolina.....	Bodie Island.....	50	23	5.0	23	5.0
173	Dayton, Ohio, Dayton.....	101 West 34 St.....	158	27	3.0	27	3.0
171	Greater Metropolitan Cleveland, Ohio: Akron.....	821 Colburn St.....	108	27	2.1	26	2.1
		City Hall.....	126	27	2.7	27	2.7
		801 Euclid Ave.....	135	19	2.2	22	2.2
176	Metro Columbus, Ohio, Columbus.....	181 South Washington Blvd.....	149	30	2.5	34	2.5
178	Northwest Pennsylvania-Youngstown: Ohio, Youngstown.....	Boardman and Phelps St.....	108	28	2.3	26	2.3
		Pennsylvania: Clearfield County.....					
		W. F. Dayne Tree Nursery.....			2.4		2.4
181	Strathtown-Wierion-Wheeling, Ohio.....	606 West 24 St.....	71	27	1.9	27	1.9
		208 Market St.....	75	21	1.9	25	1.9
181	Staubenville, Central Oklahoma, Oklahoma, Oklahoma City.....	200 North Walker.....	111	27	2.8	27	2.8
186	Northeast Oklahoma, Oklahoma, Tulsa.....	4616 East 15th St.....	48	21	2.7	27	2.7
193	Portland, Oregon, Portland.....	1490 Southwest 5th Ave.....	125	22	1.6	26	1.6
196	South Central Pennsylvania, Pennsylvania: Lancaster.....	914 Columbia Ave.....	129	25	2.8	24	2.8
		York.....	80	22	2.1	22	2.1
197	Southwest Pennsylvania, Pennsylvania: Indiana County No. 1.....	University of Pennsylvania.....	65	14	3.3	13	3.3
		Indiana County No. 2.....					
		Hillsdale.....	50	21	2.4	24	2.4
		Indiana County No. 3.....	61	26	3.0	25	3.0
200	Columbia, South Carolina, Richard P. Scarborough State Park.....	Forbes Ave. at Ross St.....	177	35	2.4	24	2.4
205	Black Hills-Rapid City, South Dakota, Black Hills.....	Rapid City Work Center.....	38	25	2.3	23	2.3
207	Eastern Tennessee-Southwest Virginia: Tennessee, Knoxville.....	617 Cumberland Ave.....	102	25	2.2	28	2.2
		Virginia, Wythe County.....	45	28	3.1	27	3.1
208	Middle Tennessee, Tennessee, Nashville.....	City Council Building.....	141	28	2.6	27	2.6
210	Ablene-Wichita Falls, Texas, Wichita Falls.....	602 Broad St.....	64	29	2.7	29	2.7

² Value below minimum detectable limit of method (5 µg/m³).
¹ Corrected for 35 percent collection efficiency.
³ Corrected for 85 percent collection efficiency.
 NOTE.—To convert to parts per million divide microgram per cubic meter by 1850.

PROPOSED RULES

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APPENDIX B—TABLE A-2

TITLE: AQCR RECLASSIFICATION STUDY—CONTINUOUS AUTOMATED NO₂ DATA

AQCR No.	AQCR name, State, and site	Site address	Chemiluminescent microgram per cubic meter	Average number of days
015	Phoenix-Tucson, Arizona, Phoenix	1845 East Roosevelt	60	64
018	Metro-Memphis, Tennessee, Memphis	1330 Frayser Blvd	31	46
024	Metro-Los Angeles, California, Los Angeles	Garden Grove	118	.....
029	San Diego, California, El Cajon	110 East Lexington	76	63
030	San Francisco Bay, California, San Jose	120B North 4th Street	84	62
036	Metro-Denver, Colorado, Denver	2165 Broadway	110	49
042	Hartford-New Haven-Springfield, Massachusetts, Springfield	East Columbus Ave	73	82
043	New Jersey-New York-Connecticut, Connecticut, Stratford	2730 Main St	65	44
045	Metro-Philadelphia, Pennsylvania, Philadelphia	2031 Race St	84	120
047	National Capital, District of Columbia, Washington	427 New Jersey Ave, NW	64	98
050	Southeast Florida, Florida, Miami	6400 Northwest 27th Ave	53	56
052	West Central Florida, Florida, Tampa	111 North Dale Mabry Highway	52	21
055	Chattanooga, Tennessee, Chattanooga	Hickory Valley Rd	38	.....
056	Metro-Atlanta, Georgia, Atlanta	Health Department, 99 Butler St., SE	62	57
067	Metro-Chicago, Illinois, Chicago	44 South Plymouth Court	121	10
068	Metro-Dubuque, Iowa, Dubuque	City Water Plant, Hawthorn Rhornberg Ave	23	96
070	Metro-St. Louis, Missouri, St. Louis	215 South 12th Boulevard	58	111
078	Louisville, Kentucky, Louisville	2500 South 3d and East Sts	68	90
079	Metro-Cincinnati, Ohio, Cincinnati	Central Avenue and Ann Sts	61	99
080	Metro-Indianapolis, Indiana, Indianapolis	Purdue University, Administration Building, 1201 East 38th St	56	79
085	Metro-Omaha-Connal Bluffs, Nebraska, Omaha	Marine Corps, Research Center, 30th and Laurel Sts	30	119
115	Metro-Baltimore, Maryland, Essex	Woodward and Dorsey Rd	64	88
122	Central Michigan, Michigan, Grand Rapids	Fire Training Station, 4th and Front St. NW	44	67
123	Metro-Detroit-Port Huron, Michigan, Detroit	1311 East Jefferson Ave	60	74
124	Metro-Toledo, Ohio, Toledo	2930 131st St	38	117
131	Minneapolis-St. Paul, Minnesota, Minneapolis	3405 University Avenue SE	47	119
151	Northeast Pennsylvania-Upper Delaware Valley, Pennsylvania, Reading	Science Building, Room, 319, Union Avenue and 13th St	60	93
160	Genesee-Finger Lakes, New York, Rochester	West End of Farmington Rd	26	103
162	Niagara Frontier, New York, Buffalo	Access Road off Dingens, Near Intersection with Weiss	49	87
173	Dayton, Ohio, Dayton	2100 Timber Lake	53	113
174	Greater-Metro-Cleveland, Ohio, Canton	City Hall Building, 218 Cleveland SW	53	122
176	Metro-Columbus, Ohio, Columbus	181 South Washington Blvd	52	49
195	Central Pennsylvania, Pennsylvania, Cambria County	Franklin Municipal Building, Franklin Boro	64	82
196	South Central Pennsylvania, Pennsylvania, Lancaster	2425 New Holland Pike	36	84
197	Southwest Pennsylvania, Pennsylvania, Pittsburgh	Arsenal Health Center, 39th and Pennsylvania Ave	64	103
214	Corpus Christi-Victoria, Texas, Corpus Christi	3041 Morgan St	43	83
215	Metro-Dallas-Ft. Worth, Texas, Dallas	City of Dallas	47	102
216	Metro-Houston-Galveston, Texas, Houston	Police Station, Houston and Lybbock	66	41
220	Wasatch Front, Utah, Salt Lake City	610 South 2d St. East	114	31
223	Hampton Roads, Virginia, Virginia Beach (Norfolk)	1444 Diamond Springs Rd	39	129
225	State Capital, Virginia, Richmond	State Fair Grounds, Laburnum Ave	37	99
229	Puget Sound, Washington, Seattle	6770 East Marginal Way South	51	51

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