



Project Summary

A Summary of the EPA National Source Performance Audit Program—1980

R. G. Fuerst, E. W. Streib, and M. R. Midgett

A national quality assurance audit program for methods used in stationary source tests was conducted in 1980 by the Quality Assurance Division of the Environmental Monitoring Systems Laboratory, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina. In this program, quality assurance materials were sent to interested participants for the measurement of a gas volume (Method 5, dry gas meter only) or the analysis of liquid samples simulating collected sulfur dioxide and nitrogen oxides (Method 6 and 7, respectively). Each participant returned the analytical results to the Source Branch, Quality Assurance Division, for evaluation. An individual report was returned to each participant after processing.

This report summarized the audit results of 1980 for those three source test methods.

This Project Summary was developed by EPA's Environmental Monitoring Systems Laboratory, Research Triangle Park, NC, to announce key findings of the research project that is fully documented in a separate report of the same title (see Project Report ordering information at back).

Introduction

To control the amount of contamination emitted to our atmosphere from stationary sources, the U.S. Environmental Protection Agency (EPA) promulgated on December 23, 1971, the first five of its New Source Performance Standards. These regulations gave EPA

the power to enforce certain emission limitation levels using specific source test methodology. But with any type of compliance testing, validity of the data must be shown. This is accomplished through a quality assurance program.

To assist in this type of program, the Environmental Monitoring Systems Laboratory (EMSL) of EPA established in 1977 a nationwide performance audit program to insure that source emission data collected for compliance determination purposes are accurate and reliable. This program had three main purposes:

- 1) To verify that the analytical and computational parts of the specific reference methods were being properly used;
- 2) to improve the accuracy of the measurement being made by providing individual performance reports with the availability of practice audit sample sets; and
- 3) to aid the participating laboratories in assessing their analytical performance relative to that of other laboratories conducting similar analyses by providing annual data summary reports.

These goals were realized by sending specific performance materials to interested laboratories for analysis.

In the semiannual source test method audits conducted in the spring and fall of 1980, the technique of volume measurement by a dry gas meter was examined. This measurement is essential to Methods 5, 8, 12, 13, and 17. Also examined were the analytical and

computational parts of Method 6 for sulfur dioxide (SO₂) and Method 7 for nitrogen oxides (NO_x). This report describes the preparation and evaluation of these tests.

Audit Participants

Using a previously compiled master list of laboratories from past audits, invitations to participate in the semi-annual source audit program for spring and fall of 1980 were sent to all volunteers who had previously participated in the audit program. Other laboratories were added to the master list through their direct contact with the Source Branch, Quality Assurance Division (QAD), or the Regional Quality Control Coordinator (RQCC).

Audit Materials

To provide a check on the calibration of the dry gas meter used in the Method 5 stack sampling train, a critical orifice device was developed to pass a certain flow rate of air through the dry gas meter when the measured vacuum on the orifice was at least 16 inches of mercury. This device allows an analyst to compare a volume measured at his location with one measured at an EPA location. Volumes measured at both locations are compared to the original calibration of the device, compensated for the effect of ambient temperature and pressure on the measurement at both locations.

For the audits of Methods 6 and 7, five different concentration levels of simulated source sulfur dioxide (SO₂) and nitrogen oxides (NO_x) samples were prepared. These solutions enabled the participants to analyze and calculate

different concentration levels of SO₂ and NO_x, using Methods 6 and 7. The true values of these samples were based on theoretical concentrations calculated from gravimetric preparations and certain assumed volume measurements.

A summary of the Method 5 data shows that an average of 75% of the 303 laboratories that requested samples returned data for the spring and fall studies. Comparing the reported results from these laboratories to the 2% *Federal Register* specification for dry gas meter accuracy, we find that in Audit 0280, 34% of the laboratories came within 2% of the EPA value, while in Audit 0880, 42% of the laboratories were able to do so.

A summary of Method 6 data shows an average of 70% of the 290 laboratories requesting samples returned data for the spring and fall studies. Of those

laboratories reporting data, 50% of the laboratories came within an average of 1.6% of the EPA value for Audit 0380. For Audit 0980, they came within 1.9%.

A summary of Method 7 data shows an average of 58% of the 240 laboratories requesting samples returned data for the spring and fall audits. Of those laboratories returning data, 50% were able to come within an average of 5.3% of the EPA value for Audit 0480, while in Audit 1080, they came within 6.4%.

To examine previous audit data for trends, a certain degree of accuracy was chosen and plotted for each method. They were: 2 percent and 5 percent accuracy for Methods 5 and 6, and 5 percent and 10 percent accuracy for Method 7.

Use was made in this report of an outlier test (Chauvenet's Criterion) to determine the values that lie outside the bulk of the collected data.

The EPA authors R. G. Fuerst (also the EPA Project Officer, see below), E. W. Streib, and M. R. Midgett are with the Environmental Monitoring Systems Laboratory, Research Triangle Park, NC 27711.

The complete report, entitled "A Summary of the EPA National Source Performance Audit Program—1980," (Order No. PB 82-108 127; Cost: \$8.00, subject to change) will be available only from:

*National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161
Telephone: 703-487-4650*

*The EPA Project Officer can be contacted at:
Environmental Monitoring Systems Laboratory
U.S. Environmental Protection Agency
Research Triangle Park, NC 27711*

United States
Environmental Protection
Agency

Center for Environmental Research
Information
Cincinnati OH 45268

Postage and
Fees Paid
Environmental
Protection
Agency
EPA 335



Official Business
Penalty for Private Use \$300

PS 0000329
U S ENVIR PROTECTION AGENCY
REGION 5 LIBRARY
230 S DEARBORN STREET
CHICAGO IL 60604