



Project Summary

A Summary of the EPA National Source Performance Audit Program - 1979

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A national quality assurance audit program for methods used in stationary source tests was conducted in 1979 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 (Methods 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.

The Project Report summarizes the audit results of 1979 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

One of the fundamental responsibilities of laboratory management is the establishment of a continuing program

to insure the reliability and validity of generated data. This is accomplished by a strong quality assurance program.

To assist in this type of program, the Environmental Monitoring Systems Laboratory (EMSL) of EPA in 1977 established 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:

- to verify that the analytical and computational parts of the specific reference methods were being properly used,
- to assist wherever possible to improve the quality of the measurement being made,
- to aid the participating laboratories in assessing their analytical performance relative to that of other laboratories conducting similar analyses.

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

EPA's National Quality Assurance Audit Program for Stationary Source Test Methods was conducted in the spring and fall of 1979. The methods examined were Method 5 (dry gas meter only), Method 6 (SO₂) and Method 7

(NO_x). The audits were conducted by the Quality Assurance Division (QAD) of EPA's Environmental Monitoring Systems Laboratory located at Research Triangle Park, North Carolina. They involved laboratories from industry, contracting firms, universities, foreign countries, and governmental agencies.

Audit Participants

Invitations to participate in the semiannual source audit program for spring and fall of 1979 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, 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.

Results

A summary of the Method 5 data shows that an average of 77% of the 247 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 0379, 34% of the laboratories came within 2% of the EPA value, while

in Audit 0879, 43% of the laboratories were able to do so.

A summary of Method 6 data shows an average of 72% of the 244 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 1.7% of the EPA value for Audit 0379. For Audit 0979 they came within 2.1%.

A summary of Method 7 data shows an average of 64% of the 203 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 7.8% of the EPA value for Audit 0379, while in Audit 1079 they came within 7.0%.

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

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

Recommendations

To create a sample repository, the Quality Assurance Division of the Environmental Monitoring Systems Laboratory intentionally produced an over-supply of samples for the audits of EPA Methods 6 and 7 discussed in this report. These stable samples are available to any laboratory having a legitimate need for them, such as training new analysts and conducting periodic external quality control checks of the laboratory. Included with these practice samples is a statement of true concentration with no requirement for return of data to EPA. We recommend that all participants make use of this sample repository, to increase their overall analytical skills with typical Methods 6 and 7 samples.

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R. G. Fuerst is the EPA Project Officer (see below).

The complete report, entitled "A Summary of the EPA National Source Performance Audit Program - 1979," (Order No. PB 81-199 366; Cost: \$8.00, subject to change) will be available only from:

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