United States
Environmental Protection
Agency

Research and Development

Environmental Monitoring Systems
Laboratory
Research Triangle Park NC 27711

EPA-600/S4-83-026 Sept. 1983

EPA

Project Summary

A Summary of the 1981 EPA National Performance Audit Program on Source Measurements

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In the spring and fall of 1981, the Quality Assurance Division (QAD) conducted its semi-annual National Audits for certain Stationary Source Test Methods. The audit materials consisted of: a critical orifice for Method 5 (dry gas meter only), five simulated, liquid samples each for Method 6 (SO_2) and Method 7 (NO_x), and two coal samples for Method 19. Industrial laboratories, contractors, universities, foreign laboratories, and local, state and Federal agencies participated.

For the Method 5 spring audit, the mean for all participants differed by 13.6% from the true (EPA) value. For the fall audit, participants' mean was 4.3% from the true value. In the two Method 6 audits, the median values measured for 9 of 10 samples differed by less than 1% from the true value, whereas the median values for all 10 samples used in the two Method 7 audits were within 2% of the true value. This was the first coal audit conducted by QAD. For the sulfur, ash, and moisture analysis, the participants' accuracy was consistently better for the higher concentration samples than for the lower concentration samples.

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

In 1977 the Environmental Monitoring Systems Laboratory (EMSL) of EPA established a performance audit program to evaluate the performance of organizations that conduct source testing using EPA Reference Methods. By participating in this free and voluntary program, users of these methods can compare their performance to other laboratories conducting similar measurements.

Laboratories participating in the audits sent their data to the Source Branch and later received a written report comparing their results to EPA's. The participants had eight weeks to return data to EPA. At the end of this period, all data were statistically analyzed to determine the participants' precision and accuracy.

Audit Materials

In the Method 5 audit procedure, participants use a critical orifice to check the calibration of the dry gas meter in their EPA Method 5 meter box. This device allows a participant to compare his measured volume to EPA's expected volume.

A summary of the 1981 Method 5 audit shows that 76% of the 350 laboratories that requested samples returned data for the spring and fall audits. The Code of Federal Regulations requires that the dry gas meter be calibrated to an accuracy of within 2 percent, so this was used as the criterion for accuracy. Only 42% of the reporting laboratories in the 0381 audit and 44% in the 0981 audit obtained this accuracy.

For the Method 6 audit, a sample set of five different dilutions of sulfuric acid was prepared. This audit checks the participant's ability to analyze a Method 6 sample for SO_2.

A summary of the 1981 Method 6 audit shows that 70% of the 311 laboratories

requesting samples returned data for the spring and fall audits. Two percent was chosen as the criterion for accuracy. Of all the data returned an average of 55% of the participants achieved an accuracy within 2%.

For the Method 7 audit, a sample set of five concentrations of potassium nitrate was prepared. This audit checks the participant's ability to analyze a Method 7 sample for NO_x.

A summary of the 1981 Method 7 audit shows that 66% of the 250 laboratories requesting samples returned data for the spring and fall audits. Three percent was chosen as the criterion for accuracy. Of all the data returned, an average of 35% of the participants achieved an accuracy of 3% for both audits.

The first coal audit by the Quality Assurance Division was conducted in 1981. This audit made use of two 60-mesh coal samples. Participants analyzed each coal sample for BTU content and percent sulfur, moisture, and ash.

A summary of the 1981 coal audit results shows that 83% of the 77 laboratories that requested samples returned data. Five percent was chosen as the accuracy criterion for each of the four parameters. For the high concentration of sulfur and moisture, 61% and 80%, respectively, of the analyses were within 5% of the expected value. However for the low concentration of sulfur and moisture, only 16% of the analyses were within the 5% criterion. The data for the gross calorific analysis were better, with 92% of the low values and 85% of the high values within 5% of the expected value.

Recommendations

The Quality Assurance Division of the Environmental Monitoring Systems Laboratory maintains a repository of audit samples for EPA Methods 6 and 7, and for coal. These stable samples are available to any laboratory having a need for them, such as for training new personnel and conducting quality control checks of the laboratory. Since the expected values for these samples are included with the analysis instructions there is no requirement for the data to be returned to EPA. We recommend that participants make use of this sample repository, to help increase their overall analytical skills.

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The complete report, entitled "A Summary of the 1981 EPA National Performance Audit Program on Source Measurements," (Order No. PB 83-252 502; Cost: $10.00, subject to change) will be available only from:

National Technical Information Service
5285 Port Royal Road
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☆U.S. GOVERNMENT PRINTING OFFICE: 1983—659-017/7177

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