



Standard Guide for Establishing a Measurement System Quality Control Program for Analytical Chemistry Laboratories Within the Nuclear Industry¹

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1. Scope

1.1 This standard provides guidance for establishing and maintaining a measurement system quality control program. Guidance is provided for general program considerations, preparation of quality control samples, analysis of quality control samples, quality control data analysis, analyst qualification, measurement system calibration, measurement method qualification, and measurement system maintenance.

1.2 This guidance is provided in the following sections:

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Analysis of Quality Control Samples	7
Quality Control Data Analysis	8
Analyst Qualification	9
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Measurement Method Qualification	11
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2. Referenced Documents

2.1 ASTM Standards:²

- C859** Terminology Relating to Nuclear Materials
- C1009** Guide for Establishing and Maintaining a Quality Assurance Program for Analytical Laboratories Within the Nuclear Industry
- C1068** Guide for Qualification of Measurement Methods by a Laboratory Within the Nuclear Industry
- C1128** Guide for Preparation of Working Reference Materials for Use in Analysis of Nuclear Fuel Cycle Materials
- C1156** Guide for Establishing Calibration for a Measurement Method Used to Analyze Nuclear Fuel Cycle Materials
- C1297** Guide for Qualification of Laboratory Analysts for

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

the Analysis of Nuclear Fuel Cycle Materials

2.2 ANSI Standards:³

- ANSI/ASQ B1** Guide for Quality Control Charts
- ANSI/ASQ B2** Control Chart Method of Analyzing Data
- ANSI/ASQ B3** Control Chart Method of Controlling Quality During Production

3. Terminology

3.1 For definitions of terms used in this guide, see Terminology **C859**.

4. Significance and Use

4.1 A laboratory quality assurance program is an essential program for laboratories within the nuclear industry. Guide **C1009** provides guidance for establishing a quality assurance program for an analytical laboratory within the nuclear industry. The basic elements of a laboratory quality assurance program are organization, quality assurance program, training and qualification, procedures, laboratory records, control of records, control of procurement, control of measuring equipment and materials, control of measurements, and deficiencies and corrective actions. This guide deals with the control of measurements aspect of the laboratory quality assurance program. **Fig. 1** shows the relationship of measurement control with other essential aspects of a laboratory quality assurance program.

4.2 The fundamental purposes of a measurement control program are to provide the *with use* assurance (real-time control) that a measurement system is performing satisfactorily and to provide the data necessary to quantify measurement system performance. The *with use* assurance is usually provided through the satisfactory analysis of quality control samples (reference value either known or unknown to the analyst). The data necessary to quantify measurement system performance is usually provided through the analysis of quality control samples or the duplicate analysis of process samples, or both. In addition to the analyses of quality control samples, the

³ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036.