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Designation: C 1189 – 95 (Reapproved 2001)

Standard Guide to Procedures for Calibrating Automatic Pedestrian SNM Monitors[1]

This standard is issued under the fixed designation C 1189; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This guide covers calibrating the energy response of the radiation detectors and setting the discriminator and alarm thresholds used in automatic pedestrian special nuclear material (SNM) monitors.

1.2 Automatic pedestrian SNM Monitors and their application are described in Guide C 1112, which suggests that the monitors be calibrated and tested when installed and that, thereafter, the calibration should be checked and the monitor tested with SNM at three-month intervals.

1.3 Dependable operation of SNM monitors rests, in part, on an effective program to test, calibrate, and maintain them. The procedures and methods described in this guide may help both to achieve dependable operation and obtain timely warning of misoperation.

1.4 This guide can be used in conjunction with other ASTM standards. Fig. 1 illustrates the relationship between calibration and other procedures described in standard guides, and it also shows how the guides relate to an SNM monitor user. The guides below the user in the figure deal with routine procedures for operational monitors. Note that Guide C 993 is an in-plant performance evaluation that is used to verify acceptable detection of SNM after a monitor is calibrated. The guides shown above the user in Fig. 1 give information on applying SNM monitors (C 1112) and on evaluating SNM monitors (C 1169) to provide comparative information on monitor performance.

2. Referenced Documents

2.1 *ASTM Standards:*

C 859 Terminology Relating to Nuclear Materials[2]

C 993 Guide for In-Plant Performance Evaluation of Automatic Pedestrian SNM Monitors[2]

C 1112 Guide for Application of Radiation Monitors to the Control and Physical Security of Special Nuclear Material[2]

C 1169 Guide for Laboratory Evaluation of Automatic Pedestrian SNM Monitor Performance[2]

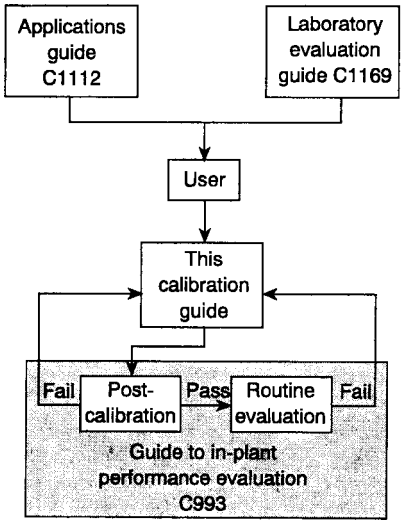

FIG. 1 The Relationship of Calibration to Other Procedures Described in Standard Guides for SNM Monitors

E 876 Practice for Use of Statistics in the Evaluation of Spectrometric Data[3]

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *calibration*—a multistep procedure that uniformly adjusts the energy response of a monitor's detector array and sets the operating parameters of its detection circuits for optimum performance. In a few monitors, an additional analog adjustment of a signal detection circuit is required.

3.1.2 *SNM*—special nuclear material: plutonium of any isotopic composition, ^{233}U, or enriched uranium as defined in Terminology C 859.

3.1.2.1 *Discussion*—This term is used here to describe both SNM and strategic SNM, which is plutonium, uranium-233, and uranium enriched to 20% or more in the ^{235}U isotope.

3.1.3 *SNM Monitor*—a radiation detection system that measures ambient radiation intensity, determines an alarm threshold from the result, and then when it monitors, sounds an alarm if its measured radiation intensity exceeds the threshold.

[1] This guide is under the jurisdiction of ASTM Committee C–26 on Nuclear Fuel Cycle and is the direct responsibility of Subcommittee C26.12 on Safeguard Applications.

Current edition approved Sept. 10, 1995. Published November 1995. Originally published as C 1189 – 91. Last previous edition C 1189 – 91.

[2] *Annual Book of ASTM Standards*, Vol 12.01.

[3] *Annual Book of ASTM Standards*, Vol 03.06.

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