

Regulatory Guide Periodic Review

Regulatory Guide Number: **5.53**

Revision: **1**

Title: **Qualification, Calibration, and Error Estimation Methods for Nondestructive Assay (February 1984)**

Office/division/branch: **NMSS/FCSE/MCAB**

Technical Lead: **Suzanne Ani**

Recommended Staff Action: **Reviewed with issues identified for future consideration**

1. What are the known technical or regulatory issues with the current version of the Regulatory Guide (RG)?

This RG was last revised in February 1984, to describe methods and procedures acceptable to the NRC staff for meeting the requirements in 10 CFR Part 70.58, "Fundamental Nuclear Material Controls," of 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material," relating to the use of nondestructive assay (NDA). The former Section 70.58 required certain licensees to establish a measurement quality assurance program for material control and accounting (MC&A). Specifically, paragraph 70.58(f) required the licensee to establish, maintain, and follow a program for the maintenance of acceptable measurement quality in terms of measurement bias and for the evaluation and control of the quality of the measurement system.

However, in 2002, the NRC revised 10 CFR Part 74, "Material Control and Accounting of Special Nuclear Material," and the requirements in 10 CFR Part 70 were transferred to 10 CFR Part 74. Specifically, the NRC revised 10 CFR Part 74.31, "Nuclear material control and accounting for special nuclear material of low strategic significance," 10 CFR Part 74.41, "Nuclear material control and accounting for special nuclear material of moderate strategic significance," and 10 CFR Part 74.51, "Nuclear material control and accounting for strategic special nuclear material." As a result, RG 5.53 is not cross-referencing to the correct regulatory citations.

In addition, the RG endorsed the American National Standards Institute (ANSI) Standard N15.20 1975, "Guide to Calibrating Nondestructive Assay Systems," which has been withdrawn with no replacement. Although this standard has been withdrawn, the RG in its current form still provides useful information for licensees for the qualification, calibration, and error estimation specific to nondestructive assay methods.

A number of American Society for Testing and Materials (ASTM) standards are currently available including the ASTM E178 "Standard Practice for Dealing with Outlying Observations," which is referenced in the guide. This standard has been revised in 2016, ASTM E178, "Standard Practice for Dealing with Outlying Observations," and it is

still active. Also, although dating to the 1960s and 1970s, it should be noted that most of the seven references listed in the guide are still available using a web search on the internet.

2. What is the impact on internal and external stakeholders of not updating the RG for the known issues, in terms of anticipated numbers of licensing and inspection activities over the next several years?

The staff is not expecting any new applications for the next 2-3 years where this RG could be used and therefore, is not affecting the licensing and inspection activities. However, during the next review the staff should review the most current technology and standards available that could be endorsed in the revised guide.

Current licensees already implemented their measurement systems and measurement methods for all SNM, including the use of different types of NDA measurements for special nuclear material. Additionally, current MC&A guidance in NUREG documents (e.g., NUREG-1280, "Acceptable Standard Format and Content for the Material Control and Accounting Plan Required for Strategic Special Nuclear Material," for Category I, "High Enriched Uranium" fuel cycle facilities, and NUREG-1065, "Acceptable Standard Format and Content for the Material Control and Accounting Plan Required for Special Nuclear Material of Low Strategic Significance," for Category III, "Low Enriched Uranium," fuel cycle facilities) include detailed discussions of measurement systems and measurement methods.

3. What is an estimate of the level of effort needed to address identified issues in terms of full-time equivalent (FTE) and contractor resources?

An estimate of the effort needed to correct the identified issues is between 0.10 full-time equivalent (FTE) and 0.20 FTE.

4. Based on the answers to the questions above, what is the staff action for this guide (Reviewed with no issues identified, Reviewed with issues identified for future consideration, Revise, or Withdraw)?

Reviewed with issues identified for future consideration.

5. Provide a conceptual plan and timeframe to address the issues identified during the review.

As discussed in Management Directive (MD) 6.6, "Regulatory Guides," the NRC staff reviews RGs approximately every 5 years to ensure that these guides continue to provide useful guidance. The staff will consider the regulatory citation issues and any other technical information that may need to be updated during the next periodic review of the guide.

NOTE: This review was conducted in August 2016, and reflects the staff's plans as of that date. These plans are tentative and subject to change.