Regulatory Guide Periodic Review

Regulatory Guide Number:	**5.38**
Revision:	**1**
Title:	**Nondestructive Assay of High-Enrichment Uranium Fuel Plates by Gamma Ray Spectrometry (October 1983)**
Office/division/branch:	**NMSS/FCSE/MCAB**
Technical Lead:	**David Ditto**
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 October 1983 to identify the application of selected techniques for gamma ray spectrometry measurement systems acceptable to NRC staff for nondestructive assay of high enriched uranium fuel plates or fuel plate core compacts for determining the physical inventory of material. This was a requirement in 10 CFR Part 70.51, "Material Balance, Inventory, and Records Requirements."

However, in 2002, the material control and accounting (MC&A) requirements of 10 CFR 70.51 were transferred to 10 CFR Part 74, “Material Control and Accounting of Special Nuclear Material.” As a result, RG 5.38 is not cross-referencing to the correct regulatory citations.

In addition, the RG is endorsing the American National Standards Institute (ANSI) Standard N15.20 1975, "Guide to Calibrating Nondestructive Assay Systems," which has been withdrawn with no replacement. Currently, a number of the Institute of Electrical and Electronics Engineers (IEEE) standards (i.e., IEEE N42.28-2002, “American National Standard Calibration of Germanium Detectors for In-Situ Gamma-Ray Measurements”) are available and active for High Enrichment Gamma-Ray Spectrometry Systems for measurement of SNM. During the next review the staff should review the most current technology and standards available that could be endorsed in the revised guide.

Currently licensees authorized to possess highly enriched uranium are required to account for each element and isotope as prescribed in 10 CFR Part 74. Combining this measurement with the results of an independent measurement of the uranium-235 enrichment enables the total uranium content of the fuel plates to be determined.

This RG remains applicable to Category I, “High Enriched Uranium” fuel cycle facilities currently licensed by the NRC. Licensees who manufacture high-enrichment uranium

fuel plates incorporate the gamma ray assay techniques described in this RG to achieve the regulatory requirements in 10 CFR Part 74. The guide provides a standard format and content for developing MC&A programs for gamma ray spectrometry systems suitable for nondestructive assay of high-enrichment uranium fuel plates, and the terms used in this RG are current with the methods and procedures used by licensees.

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.

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 FTE and 0.20 FTE.

3. 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.

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

As discussed in Management Directive 6.6, “Regulatory Guides,” the NRC staff reviews RGs approximately every 5 years to ensure that these continue to provide useful guidance. When this RG comes up for its next periodic review, the staff should revise the RG, as needed, addressing the regulatory and technical issues identified in Question 1 above.

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.