

Regulatory Guide Periodic Review

Regulatory Guide Number: **5.21, Revision 1**

Title: **Nondestructive Uranium-235 Enrichment Assay By Gamma Ray Spectrometry (December 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 issued in December 1983 to describe acceptable procedures for the use of nondestructive gamma ray spectrometry methods in the measurement of special nuclear material (SNM) to establish and maintain a system to ensure protection against and detection of unauthorized enrichment as well as enrichment exceeding 10% of the fissile isotope uranium-235 (U-235), and to resolve indications of missing material for each element and fissile isotope for enriched uranium contained in material in process, as required by 10 CFR 70.51, "Domestic Licensing of Special Nuclear Material."

However, in 2002 the NRC revised 10 CFR Part 74, "Material Control and Accounting of Special Nuclear Material," which transferred the requirements in 10 CFR Part 70.51 for nondestructive assay (NDA) of the enrichment or relative concentration of the fissile isotope U-235 in uranium to 10 CFR Part 74. Specifically, the NRC revised 10 CFR Part 74.33, "Nuclear material control and accounting for uranium enrichment facilities authorized to produce special nuclear material of low strategic significance," to include such requirements. As a result, RG 5.21 is not cross-referencing to the correct regulatory citations.

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?

This RG remains applicable to Category III, "Low Enriched Uranium," fuel cycle facilities currently licensed by the NRC. Licensees who enrich uranium are required to meet material control and accounting (MC&A) measurement systems performance objectives to a level of effectiveness sufficient to establish protection against and detection of missing material, uranium enriched above 0.711% but less than 10% in isotope of U-235, and unauthorized production of uranium.

Although the citation to the NRC regulations has changed in RG 5.21, the NRC licensees who enrich uranium are still using this RG routinely to account for applicable

MC&A measurement systems, and also to use the NDA techniques in this RG to comply with the requirements in 10 CFR Part 74.

As no technical issues were identified, there is no impact to internal or external stakeholders resulting from the revision of the regulations. However, new applicants need to be reminded of the administrative change in numbering of the CFR.

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. No contractor support is anticipated.

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 June 2016, and reflects the staff's plans as of that date. These plans are tentative and subject to change.