

REFERENCES

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Alvar, K., H. Lukens, and N. Lurie, "Standard Containers for SNM Storage, Transfer, and Measurement," U.S. Nuclear Regulatory Commission, NUREG/CR-1847, 1980. Available through the NRC/GPO Sales Program, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555.

This report describes the variations of container properties (especially wall thicknesses) and their effects on NDA measurements. A candidate list of standard containers, each sufficiently uniform to cause less than 0.2 percent variation in assay results, is given, along with comments on the value and impact of container standardization.

Augustson, R. H., and T. D. Reilly, "Fundamentals of Passive Nondestructive Assay of Fissionable Material," Los Alamos Scientific Laboratory, LA-5651-M, Albuquerque, New Mexico, 1974.

This report contains a wealth of information on nondestructive assay techniques and their associated instrumentation and has an extensive treatise on gamma ray enrichment measurements.

Sher, R., and S. Untermeyer, "The Detection of Fissionable Materials by Nondestructive Means," American Nuclear Society Monograph, La Grange Park, Illinois, 1980.

This book contains a helpful overview of a wide variety of nondestructive assay techniques, including enrichment measurement by gamma ray spectrometry. In addition, it contains a rather extensive discussion of error estimation, measurement control techniques, and measurement statistics.

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VALUE/IMPACT STATEMENT

I. PROPOSED ACTION

1.1 Description

Licenses authorized to possess at any one time more than one effective kilogram of special nuclear material (SNM) are required in § 70.51 of 10 CFR Part 70 to determine the inventory difference (ID) and the associated standard error (SEID) for each element and the fissile isotope of uranium contained in material in process. The determination is made by measuring the quantity of the element and of the fissile isotope for uranium.

It is not usually possible to determine both element and isotope with one measurement. Therefore, a combination of techniques is required to measure the SNM ID and the SEID by element and by fissile isotope. Passive gamma ray spectroscopy is a nondestructive method for measuring the relative concentration of the fissile isotope ^{235}U in uranium. This technique is then used in conjunction with an assay for the element uranium to determine the amount of ^{235}U .

Regulatory Guide 5.21 describes conditions for ^{235}U enrichment measurements using gamma ray spectroscopy that are acceptable to the NRC staff. The proposed action will revise the guide to conform to current usage and to add information on the state of the art of this technique.

1.2 Need

The proposed action is needed to bring Regulatory Guide 5.21 up to date.

1.3 Value/Impact Assessment

1.3.1 NRC Operations

The experience and improvements in technology that have occurred since the guide was issued will be made available for use in the regulatory process. Using these updated techniques should have no adverse impact.

1.3.2 Other Government Agencies

Not applicable.

1.3.3 Industry

Since industry is already applying the techniques discussed in the guide, updating these techniques should have no adverse impact.

1.3.4 Public

No impact on the public can be foreseen.

1.4 Decision on Proposed Action

The guide should be revised to reflect improvements in technique and to bring the guide into conformity with current usage.

2. TECHNICAL APPROACH

Not applicable.

3. PROCEDURAL APPROACH

Of the alternative procedures considered, revision of the existing regulatory guide was selected as the most advantageous and cost effective.

4. STATUTORY CONSIDERATIONS

4.1 NRC Authority

Authority for the proposed action is derived from the Atomic Energy Act of 1954, as amended, and the Energy Reorganization Act of 1974, as amended, and implemented through the Commission's regulations.

4.2 Need for NEPA Assessment

The proposed action is not a major action that may significantly affect the quality of the human environment and does not require an environmental impact statement.

5. RELATIONSHIP TO OTHER EXISTING OR PROPOSED REGULATIONS OR POLICIES

The proposed action is one of a series of revisions of existing regulatory guides on nondestructive assay techniques.

6. SUMMARY AND CONCLUSIONS

Regulatory Guide 5.21 should be revised to bring it up to date.

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