

Regulatory Guide Periodic Review

Regulatory Guide Number: **5.4**

Revision: **0**

Title: **Standard Analytical Methods for the Measurement of Uranium Tetrafluoride (UF₄) and Uranium Hexafluoride (UF₆) (February 1973)**

Office/Division/Branch: **NMSS/FCSE/MCAB**

Technical Lead: **Tom Pham**

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 February 1973 by the U.S. Atomic Energy Commission (AEC) to provide guidance on acceptable methods to measure uranium tetrafluoride (UF₄) and uranium hexafluoride (UF₆) to comply with 10 CFR Part 70.22, "Contents of applications." However, in 1984 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material," was revised and the citations for the material control and accounting (MC&A) requirements have changed. As a result, RG 5.4 is not cross-referencing to the correct regulatory requirements.

In addition, the RG endorsed two American National Standards Institute (ANSI) standards: ANSI N15.6-1972, "Analytical Standards for Accountability of Uranium Tetrafluoride," and ANSI N15.7-1972, "Analytical Standards for the Accountability of Uranium Hexafluoride." Over the decades, these ANSI standards were revised and updated, but currently are inactive. However, the American Society for Testing and Materials (ASTM International) has developed standards for the nuclear industries such as ASTM C-761, "Standard Test Methods for Chemical, Mass Spectrometric, Spectrochemical, Nuclear, and Radiochemical Analysis of Uranium Hexafluoride," which was published in 2011 and it is still active.

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 special nuclear material, including the determination of uranium tetrafluoride and uranium hexafluoride materials. 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," 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 I, "High Enriched Uranium" fuel cycle facilities, and Category III, "Low Enriched Uranium," fuel cycle facilities, respectively) 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 and develop a revision of the guide.

This RG could be possibly combined with RG 5.5, "Standard Methods for Chemical, Mass Spectrometric, and Spectrochemical Analysis of Nuclear-Grade Uranium Dioxide Powers and Pellets," and RG 5.39, "General Methods for the Analysis of Uranyl Nitrate Solutions for Assay, Isotopic Distribution, and Impurity Determinations," to address different analytical measurement methods for various nuclear material types.

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.