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# REGULATORY GUIDE

DIRECTORATE OF REGULATORY STANDARDS

## REGULATORY GUIDE 5.5

### STANDARD METHODS FOR CHEMICAL, MASS SPECTROMETRIC, AND SPECTROCHEMICAL ANALYSIS OF NUCLEAR-GRADE URANIUM DIOXIDE POWDERS AND PELLETS

#### A. INTRODUCTION

Paragraph 70.22(b) of 10 CFR Part 70, "Special Nuclear Material," requires an applicant for a license to possess certain quantities of special nuclear material in an unsealed form to describe, among other things, his procedures for control of and accounting for such material. This guide identifies acceptable methods for chemical, isotopic, and impurity analysis which an applicant may specify as part of his procedures for accounting for special nuclear material.

#### B. DISCUSSION

Committee C-26 on Fuel, Control, and Moderator Materials for Nuclear Reactor Applications of the American Society for Testing and Materials (ASTM) has developed a standard containing some methods for the analytical chemical analysis of nuclear-grade uranium dioxide powders and pellets. These methods cover the analysis for uranium content by a titrimetric and gravimetric method to be used for uranium dioxide of varying impurity levels and sample sizes, for

oxygen-uranium atomic ratio to verify stoichiometry, for verification of isotopic uranium composition, and for various impurities such as carbon, chloride, fluoride, moisture, nitrogen, sulfur, and trace elements. This standard was approved by the ASTM on March 3, 1972, and published in May 1972 with the designation C 696-72.<sup>1</sup>

#### C. REGULATORY POSITION

The analytical methods for the measurement of nuclear-grade uranium dioxide powders and pellets contained in ASTM Standard C 696-72, "Standard Methods for Chemical, Mass Spectrometric, and Spectrochemical Analysis of Nuclear-Grade Uranium Dioxide Powders and Pellets," are generally acceptable and provide an adequate basis for the assay, isotopic measurement, and impurity analysis of nuclear-grade uranium dioxide powders and pellets.

<sup>1</sup> Copies may be obtained from the American Society for Testing and Materials, 1916 Race St., Philadelphia, Pa. 19103.

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