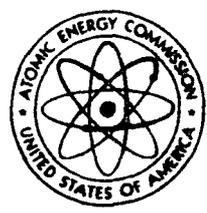


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January 1974



# U.S. ATOMIC ENERGY COMMISSION REGULATORY GUIDE DIRECTORATE OF REGULATORY STANDARDS

## REGULATORY GUIDE 5.19

### METHODS FOR THE ACCOUNTABILITY OF PLUTONIUM NITRATE SOLUTIONS

#### A. INTRODUCTION

Section 70.22(b) of 10 CFR Part 70, "Special Nuclear Material," requires, in part, that an applicant for a license to possess certain quantities of special nuclear material in an unsealed form describe his procedures for control of and accounting for special nuclear material. This regulatory guide identifies methods and criteria acceptable to the AEC Regulatory staff for the sampling, subsampling, sample handling, chemical and isotopic analysis, and error analysis for the accountability of plutonium nitrate solutions.

#### B. DISCUSSION

The Lawrence Livermore Laboratory and the U.S. Atomic Energy Commission have recently published a document (WASH 1282) entitled "Methods for the Accountability of Plutonium Nitrate Solutions." This document describes methods for the sampling, subsampling, sample handling, chemical and isotopic analysis, and error analysis of plutonium nitrate solutions. Topics included in the report under the section on sampling methods are discussion and rationale of sampling, homogeneity problems, and the sampling of bottles and tanks. The sections on sample handling and subsampling include discussions on containers, labeling, and sources of error. The analytical procedures presented and discussed are (1) controlled-potential coulometry, amperometry, and modified amperometry as assay methods; (2) ion exchange cleanup, spectrographic analysis, and iron determination by

spectrophotometry, for impurity removal or determination; (3) free acid determination; and (4) isotopic analysis by mass spectrometry and alpha-pulse-height analysis (Pu-238). The bases for the selection of the destructive analytical methods described in this document are as follows:

1. High precision and accuracy combined with ease of use and low cost.
2. Broad applicability to various types of solutions and plutonium concentrations and relative freedom from interfering substances.
3. Thoroughness with which the methods have been studied by various research laboratories, the extent and success of their use under actual plant conditions, and the historical evaluations they have been subjected to under various round robin programs.

#### C. REGULATORY POSITION

The accountability methods and related procedures for the sampling, subsampling, sample handling, chemical and isotopic analysis, and error analysis of plutonium nitrate solutions contained in WASH 1282, "Methods for the Accountability of Plutonium Nitrate Solutions,"<sup>1</sup> are generally acceptable and provide an adequate basis for the accountability of plutonium nitrate solutions.

<sup>1</sup> Copies may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402

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Copies of published guides may be obtained by request indicating the divisions desired to the U.S. Atomic Energy Commission, Washington, D.C. 20545, Attention: Director of Regulatory Standards. Comments and suggestions for improvements in these guides are encouraged and should be sent to the Secretary of the Commission, U.S. Atomic Energy Commission, Washington, D.C. 20545, Attention: Chief, Public Proceedings Staff.

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