



ANALYTICAL TEST METHOD

METHOD NO.
5.2.9.5 Rev. 7
AUTHOR

NUCLEAR ENERGY GROUP

APPROVED BY
[Redacted]
CONSULTING ENGINEER
ANALYTICAL & TEST METHODS

SUBJECT
DETERMINATION OF WEIGHT PERCENT
U235 IN AN ACID MEDIA BY GAMMA
SPECTROMETRY

CLASSIFICATION
Gamma Spectroscopy

ISSUED BY
PRODUCT ASSURANCE MANAGER

COMPANY PRIVATE
NEDE-11373

- 1. SCOPE
 - 1.1
- 2. PRINCIPAL
 - 2.11

3. APPARATUS

3.1 A block diagram of the gamma counter, frequently referred to as the ENRICHMENT ANALYZER, is presented in Figure 1.

FULL IMPLEMENTATION DATE 2/25/81
INITIAL

Information in this record was deleted
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Act, exemptions 4
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FIGURE 1. COMPONENTS OF THE ENRICHMENT ANALYZER

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3.2 Electronic Component Settings.

3.2.1

3.2.2

3.2.3

3.2.4

3.2.5

3.3

3.4 Analytical balance.

REAGENTS

4.1

~~SPECIAL PRECAUTIONS~~

5.1

CALIBRATION AND VERIFICATION (See Note 11.1)

6.1

6.2

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6.2.2 /

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6.2.4

6.2.5

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SAMPLE PREPARATION

7.1

7.2 The method assumes the uranium specimen does not contain significant amounts of non-volatile impurities. Provision is made for the deliberate addition of gadolinia (see Step 8.1).

PROCEDURE

8.1

8.2

8.3

8.4

CALCULATION OF SAMPLE

9.1 Obtain the uranium and interference counts for sample and HNO₃ (1+1) blank.

9.2

(See Section 6.2 for derivation of the K and M constants, and the identification of characters used in the equation.)

RELIABILITY

NOTES

11.1

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11.2

This program is documented in the Chemet Laboratories Control System Document, "Software Specification No. 79-ENR-02."

11.3 Weights are calculated from the following equation: (See Reference 12.6)

11.3.1

11.4

11.5

11.6

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12. REFERENCES

12.1 [redacted] and [redacted] "Enrichment Analyzer: Liquid Samples for Determining Weight Percent of U-235, "G.E., APED-5213, October 1967.

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- 12.2 D.K. Cartwright and E.J. Robbins, "A Source of Error in the Determination of U-235 By Gamma Spectrometry," J. Inorg, Nuclear Chem. 12, 373-376 (1960).
- 12.3 [REDACTED] "Sample Weight for U-235 Determination in Gadolinia Fuel, "QTD-78-087 (letter to S.W. Dale), February 8, 1978.
- 12.4 [REDACTED] "Gravimetric Method for O-to-U, O-to-M, and Quality Control for (U, Gd)₂O₃ Fuel Pellets," NEDE-12701, May 1978.
- 12.5 [REDACTED] "Sample Weights for U-235 Determination in Gadolinia Fuels, "QTD-78-757, December 1978.
- 12.6 [REDACTED] "Equation and Table of Sample Weights for U-235 Determination in GadFuel," QTD-78-795 (letter to T.P. Winslow), December 5, 1978.
- 12.7 [REDACTED], Chemet Laboratory Measurement System document, "Advanced Enrichment Analyzer Systems Software Specification," 79-ENR-02, R1, December 1979.
- 12.8 [REDACTED], DRF A00-784, "Passive Liquid Enrichment Analysis Upgrade," November 1979.

REVISION HISTORY

- 13.1 [REDACTED] Rev. 0, October 25, 1971
- 13.2 [REDACTED] Rev. 1, May 16, 1973
- 13.3 [REDACTED] Rev. 2, October 20, 1975
- 13.4 [REDACTED] Rev. 3, April 5, 1976
- 13.5 [REDACTED] Rev. 4, February 16, 1979
- 13.6 [REDACTED] Rev. 5, March 12, 1979
- 13.7 [REDACTED] Rev. 6, June 9, 1980

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