. S. Department of Commerce
Malcolm Baldrige
Secretary

National Bureau of Standards
Ernest Ambler, Director

National Bureau of Standards

Certificate

Standard Reference Material U-015

Uranium Isotopic Standard

(Nominally 1.5% Enriched)

	^{234}U	^{235}U	^{236}U	^{238}U
Atom Percent	0.00850	1.5323	0.0164	98.443
	±.00009	±0.0015	±.0001	±0.002
Weight Percent	.00836	1.5132	.0163	98.462

This Standard Reference Material (SRM) is certified for use as an isotopic standard. The primary intended use is for the evaluation of mass discrimination effects encountered in the operation of a mass spectrometer.

The material is a highly purified uranium oxide, U_3O_8. The atomic weight of the material is calculated to be 238.004, using the nuclidic masses 234.0409; 235.0439; 236.0457; and 238.0508.

The values for ^{234}U and ^{236}U were calculated from measurements at the National Bureau of Standards. The samples were spiked with high-purity ^{233}U to approximate the ^{234}U concentration, the ratios ^{233}U to ^{234}U and ^{233}U to ^{236}U were measured on a triple-filament equipped surface ionization mass spectrometer with ion-multiplier amplifier circuits.

The values for ^{235}U and ^{238}U were calculated from measurements of the ^{235}U to ^{238}U ratio made at the National Bureau of Standards on a triple-filament, surface ionization mass spectrometer equipped with d-c amplifier circuits. The observed ratios were corrected for mass discrimination effects by intercomparison with synthetic mixtures prepared at the 1.5 percent ^{235}U level from high-purity ^{235}U and ^{238}U.

The indicated uncertainties for the isotopic concentrations are at the 95-percent confidence level for a single determination, and include allowances for inhomogeneities in the material as well as analytical error. The ^{235}U to ^{238}U ratio for this standard, 0.015565, is known to at least 0.1 percent.

Measurements leading to the certification of this SRM were made by E. L. Garner, and L. A. Machlan.

The overall direction and coordination of the technical measurements leading to certification were performed under the chairmanship of W. R. Shields.

The technical and support aspects in the preparation, certification, and issuance of this Standard Reference Material were coordinated through the Office of Standard Reference Materials by J. L. Hague.

NOTE: In many industries traceability of their quality control process to the national measurement system is carried out through the mechanisms of SRM's. It may be therefore of interest to know the details of the measurements made at NBS in arriving at the certified values of this SRM. An NBS Special Publication, 260-27, is reserved for this purpose and is available from the NBS Office of Standard Reference Materials upon request.

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Certificate dated 7-30-70)

George A. Uriano, Chief
Office of Standard Reference Materials