



New Brunswick Laboratory
U.S. Department of Energy

Certificate of Analysis
CRM U015

Uranium Isotopic Standard
10 mg Uranium as U₃O₈

	²³⁴ U	²³⁵ U	²³⁶ U	²³⁸ U
Atom Percent:	0.00850	1.5323	0.0164	98.443
Uncertainty:	±0.00009	±0.0015	±0.0001	±0.002
Weight Percent:	0.00836	1.5132	0.0163	98.462

This Certified Reference Material (CRM) is primarily intended for the calibration of mass spectrometers used to perform uranium isotopic measurements. The specific purpose of this isotopic standard is for the determination of mass discrimination effects for uranium isotopes being measured under similar analytical conditions. Each unit of CRM U015 consists of approximately 10 milligrams of uranium, in the form of highly purified U₃O₈, contained in a glass bottle.

The indicated uncertainties for the isotopic composition of the CRM are 95% confidence intervals for a single determination. This term can be defined as an approximate two-sigma limit, where sigma is the standard deviation of the measurements data obtained from the material. The uncertainties include allowances for inhomogeneity of the material as well as analytical error.

This CRM was originally issued in 1970 by the National Bureau of Standards (NBS) as Standard Reference Material (SRM) U-015. The measurements made at NBS leading to the certification were performed by E. L. Garner, L. A. Machlan and L.J. Moore, under the direction of W. R. Shields. In 1987, the technical and administrative transfer of NBS Special Nuclear SRMs into the NBL CRM Program was coordinated by the NBS Office of Standard Reference Materials and N. M. Trahey, NBL.

The ²³⁵U/²³⁸U measurements were made on a single stage thermal ionization mass spectrometry equipped with a Faraday cup detection system. The isotope ratios were corrected for mass discrimination effects by intercomparison with synthetic calibration mixtures of similar ²³⁵U levels, prepared from high-purity ²³⁵U and ²³⁸U separated isotopes. The ²³⁵U/²³⁸U value for this standard, 0.015565, is known to at least 0.1%.

The ²³⁴U and ²³⁶U abundances were determined at NBS by isotope dilution mass spectrometer using high-purity ²³³U as the spike. The ²³⁵U values obtained from Union Carbide and Goodyear Atomic are based upon direct ²³⁵U concentration determination by oxide dilution and UF₆ analysis. The minor isotopes were calculated using the NBS values and the ²³⁸U value obtained by difference.

NOTE: NBS Special Publication 260-27 presents further details of the measurements made at NBS which provided the basis for the certification, and is available from the NBS Office of Standard Reference Materials

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www.nbl.doe.gov
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