New Brunswick Laboratory
U.S. Department of Energy

Certificate of Analysis

CRM U100

Uranium Isotopic Standard

10 mg Uranium as U_3O_8

	^{234}U	^{235}U	^{236}U	^{238}U
Atom Percent:	**0.0676**	**10.190**	**0.0379**	**89.704**
Uncertainty:	**±0.0002**	**±0.010**	**±0.0001**	**±0.010**
Weight Percent:	**0.0666**	**10.075**	**0.0376**	**89.821**

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 U100 consists of approximately 10 milligram of uranium, in the form of highly purified U_3O_8, 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-100. The measurements made at NBS leading to the certification were performed by E. L. Garner, L. A. Machlan, M.S. Richmond and 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 $^{235}U/^{238}U$ measurements were made on a single stage thermal ionization mass spectrometer equipped with a Faraday cup detection system. The isotope ratios were corrected for mass discrimination effects by intercomparison with synthetic calibration mixtures of similar ^{235}U levels, prepared from high-purity ^{235}U and ^{238}U separated isotopes. The $^{235}U/^{238}U$ value for this standard, 0.11360, is known to at least 0.1%.

The ^{234}U and ^{236}U abundances were determined by isotope dilution mass spectrometry using high-purity ^{233}U as the spike. These measurements were performed on a thermal ionization mass spectrometer equipped with an ion-multiplier detection system.

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

March 30, 2008
Argonne, Illinois

Jon Neuhoff, Director
New Brunswick Laboratory

(Editorial revision of Certificate dated October 1, 1987)