



New Brunswick Laboratory
U.S. Department of Energy

Certificate of Analysis
CRM 109-A
Monazite Sand – Silica Mixture
Thorium Standard

Thorium: $0.01052_6 \pm 0.00009_8$ Wt.%
($\alpha = 0.05$, $df = 9$)

*Uranium (calculated): 4.18×10^{-4} Wt.%

This Certified Reference Material (CRM) was prepared by milling and blending NBL CRM 7-A Monazite Sand (9.7% ThO₂) with silica (99.9% SiO₂) to obtain a uniform mixture of desired thorium concentration. Characterization and certification analyses for thorium content were performed on ten (10) units selected from the packaged final product.

The certified value listed above is expressed in terms of 95% confidence limits, defined as $\bar{x} \pm \sigma \cdot t$, where \bar{x} is the unweighted mean of the measurement data, σ is the standard deviation of the mean, and t is the Student's t value for the indicated degrees of freedom (df) and at the 5% significance level (α).

REFERENCE METHODS OF ANALYSIS: Spectrophotometry verified with NBL Thorium Oxide (ThO₂).

*Calculation is based on the uranium oxide (U₃O₈) value of $0.399_3 \pm 0.017_1$ Wt% U₃O₈ for NBL CRM 7-A Monazite Sand.

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Argonne, Illinois

www.nbl.doe.gov
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(Editorial revision of NBL Certificate dated February 1981)