U. S. Department of Commerce
Frederick B. Dent
Secretary
nal Bureau of Standards
d W. Roberts, Director

National Bureau of Standards
Certificate
Standard Reference Material

Alpha-Particle Radioactivity Standard 4333
Americium-243-Neptunium-239

This Standard Reference Material consists of carrier-free americium-243-neptunium-239 in approximately 5 grams of 1 M HCl in a borosilicate glass ampoule.

The activity of americium-243 plus alpha-particle-emitting impurities in nuclear transformations per second per gram of solution in September 1974 was

$$* \ 3.17_1 \pm 1.5\% \ *.$$

This Standard Reference Material was prepared by quantitatively diluting a master solution that had been calibrated by means of the NBS $0.8\pi\alpha$ scintillation counter.

The uncertainty in the activity, 1.5 percent, is the linear sum of 0.6 percent, which is the limit of the random error at the 99% confidence level ($5.841\ S_m$, where S_m is the standard error computed from four sets of measurements), and the estimated upper limits of conceivable systematic errors associated with these measurements, dilution of the master solution, and preparation of this ampoule.

A half-life of 7.4×10^3 years is suggested, and is the value adopted by the compilers of the Nuclear Data Sheets [Section B, Vol. 3, No. 2, May 1969].

An evaporated drop of the master solution was examined with a silicon surface-barrier detector, and alpha particles with energies identifiable with those from americium-241 and curium-244 were detected. The $^{241}Am/^{243}Am$ and $^{244}Cm/^{243}Am$ activity ratios were approximately 0.002 and 0.005, respectively, in September 1974.

This Standard Reference Material was prepared and calibrated in the NBS Center for Radiation Research, Radioactivity Section, W. B. Mann, Chief.

Washington, D. C. 20234
October, 1974

J. Paul Cali, Chief
Office of Standard Reference Materials

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