U. S. Department of Commerce
Malcolm Baldrige
Secretary

National Bureau of Standards
Ernest Ambler, Director

National Bureau of Standards

Certificate of Analysis

Standard Reference Material 947

Plutonium Isotopic Standard

This Standard Reference Material (SRM) is certified as an isotopic standard for use in isotopic measurements of plutonium. SRM 947 consists of approximately 250 mg of plutonium in the form of plutonium sulfate tetrahydrate packaged in a glass microbottle.

	^{238}Pu	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
Atom Percent*	0.278 ±0.006	77.089 ±0.022	18.610 ±0.022	2.821 ±0.006	1.202 ±0.004

**As of January 1, 1982, refer to Table 1 for quarterly decay-adjusted values.*

The plutonium isotopic distribution was determined by thermal ionization mass spectrometry at the National Bureau of Standards (NBS) on samples from which americium and uranium were removed. Because high-purity plutonium isotopes have not been used to prepare known synthetic mixtures, the accuracy is dependent on uranium and plutonium exhibiting similar behavior. The observed mass spectrometer data were corrected for mass discrimination effects using data from the analysis of uranium isotopic SRM's that had been analyzed under similar conditions.

SRM 947 contains uranium and americium isotopes, including growing-in daughters of plutonium that are isobaric with the plutonium isotopes. In addition, there may be radiation damage to the glass bottle and the teflon cap liner resulting in small glass slivers. Therefore, in its use, a chemical separation that provides a purified plutonium fraction is essential to the attainment of high accuracy.

Measurements leading to the certification of this SRM were made in the Inorganic Analytical Research Division by E.L. Garner and L.A. Machlan.

The technical and support aspects involved in the revision of this Certificate were coordinated through the Office of Standard Reference Materials by T.E. Gills.

August 19, 1982
Washington, D.C. 20234
(Revision of Certificate
dated 12-3-71)

George A. Uriano, Chief
Office of Standard Reference Materials

(over)

The decay-adjusted values for the plutonium isotopic composition, in atom percent, are tabulated below in Table 1. The half-life values, in years, used for the decay-adjustment are: ^{238}Pu, 87.74; ^{239}Pu, 24,119; ^{240}Pu, 6,560; ^{241}Pu, 14.34; and ^{242}Pu, 387,000.

Table 1
Decay-Adjusted Plutonium Isotopic Composition
Atom Percent

Date	^{238}Pu	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
January 1, 1982	0.278	77.089	18.610	2.821	1.202
April 1, 1982	.278	77.115	18.616	2.789	1.202
July 1, 1982	.277	77.142	18.622	2.756	1.203
October 1, 1982	.277	77.168	18.628	2.724	1.203
January 1, 1983	.276	77.194	18.634	2.692	1.204
April 1, 1983	.276	77.219	18.640	2.661	1.204
July 1, 1983	.275	77.245	18.645	2.630	1.205
October 1, 1983	.275	77.270	18.651	2.599	1.205
January 1, 1984	.275	77.295	18.657	2.568	1.205
April 1, 1984	.274	77.319	18.662	2.538	1.206
July 1, 1984	.274	77.344	18.668	2.509	1.206
October 1, 1984	.273	77.368	18.673	2.479	1.206
January 1, 1985	.273	77.392	18.679	2.450	1.207
April 1, 1985	.272	77.415	18.684	2.422	1.207
July 1, 1985	.272	77.438	18.689	2.393	1.208
October 1, 1985	.271	77.461	18.694	2.365	1.208
January 1, 1986	.271	77.484	18.700	2.337	1.208
April 1, 1986	.270	77.506	18.704	2.310	1.209
July 1, 1986	.270	77.528	18.709	2.283	1.209
October 1, 1986	.270	77.550	18.714	2.256	1.209
95% Confidence Limit:	±0.006	±0.022	±0.022	±0.006	±0.004