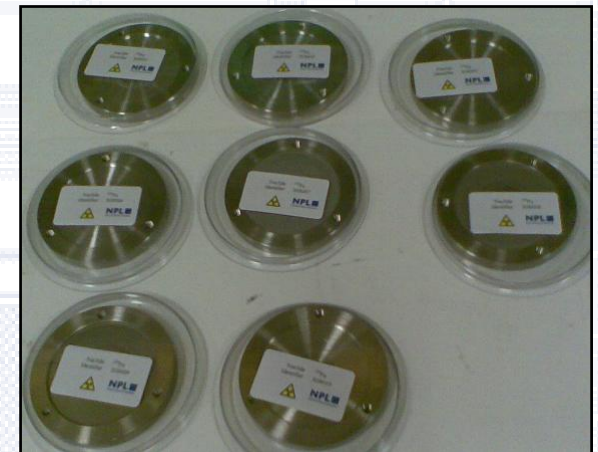


Manufacture of Electrodeposited Sources for use with UKAEA Ion Sense Monitor (Weird Sources from NPL)

Chris Gilligan
28 May 2008



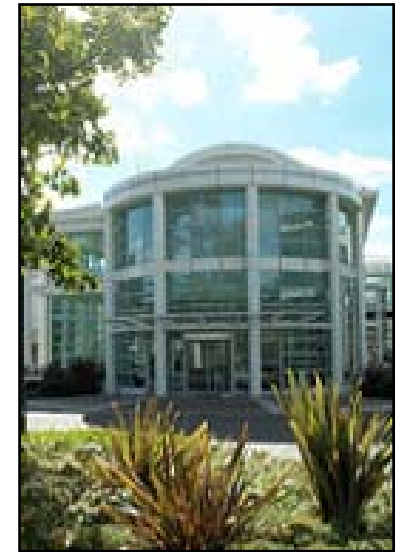
Contents

- What can NPL do? Source Manufacture
- Production of Specialized Sources at NPL
- Manufacture ^{239}Pu Sources for UKAEA, January 2008



Source Manufacture at NPL

- EA Authorisation to hold MBq, GBq, TBq open Sources!
- 3000 sources stored at NPL >80 nuclides ^3H to ^{252}Cf
- State-of-the-art Radiochemistry Labs
- Experts in Radiochemistry



Production of 'Specialized' Sources at NPL

- Filter Sources for CTBTO



- Environmental PTE, six mixed nuclides solutions, concrete 250 samples Bq kg⁻¹ to Bq g⁻¹



- Synthetic Urine for Internal Dosimetry Services (³H)



Production of ^{239}Pu for UKAEA

Background

Monitors are used to measure pipes, which have carried MOX (Pu+U) fuel.

The pipes are treated with extreme prejudice to remove activity which leaves the surface highly textured.

Aim

Make a 'realistic' ^{239}Pu calibration sources on shot blasted stainless steel

Production of ^{239}Pu for UKAEA

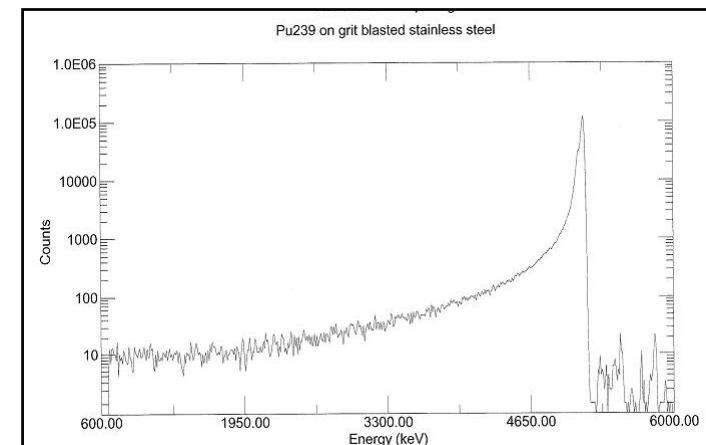
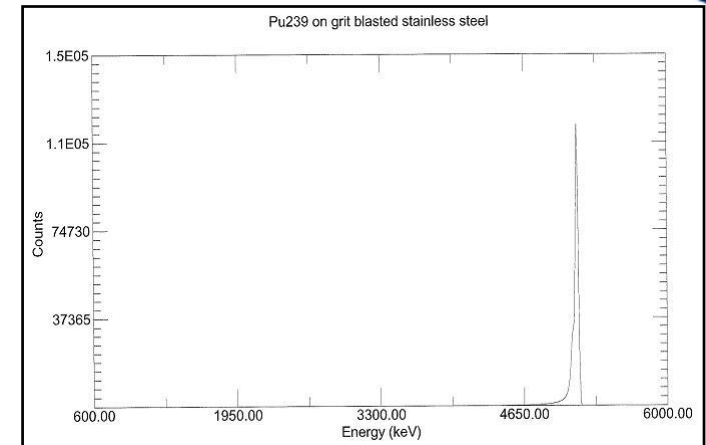
- Weigh standardised ^{239}Pu solution to cell
- Buffered to pH 3.5 with ammonium sulphate
- Constant current power supply $\frac{1}{2}$ amp
- Determine remaining ^{239}Pu using LSC
- Measure SER and alpha spectrum



Results

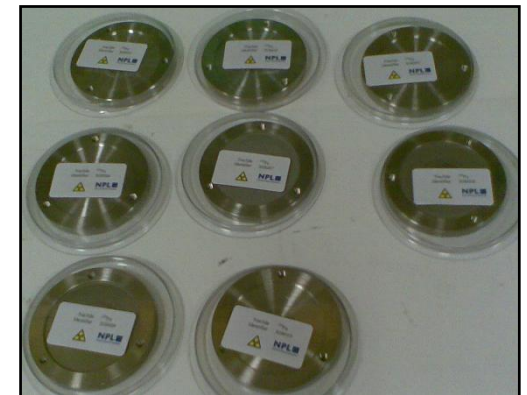
- SER determined for all sources
- Alpha Spectrometry ~40 keV FWHM
- Activity ~ 2x SER
- Problems with low yields

Source ID	SER	Yield %	Bq	Ratio SER / Bq
X08008	536	98	1143	0.47
X08010	1322	98	2743	0.48



Summary

- NPL can offer a variety of custom made sources
- NPL made 'realistic' ^{239}Pu calibration sources on shot blasted stainless steel.
- NPL has a world class facilities and knowledge.
We provide solutions to measurement problems



Thank you

Questions?