

Case Study

CANBERRA

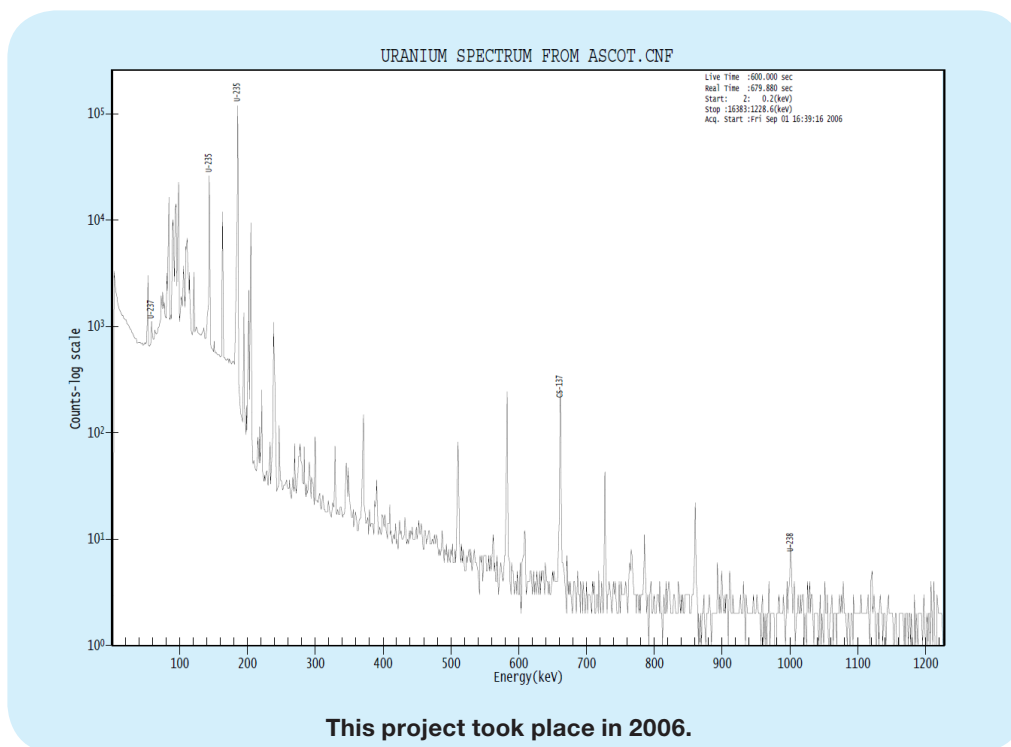
Measurement of ^{235}U enrichment for a variety of Uranium items

Scope:

This project was to provide quantitative ^{235}U enrichment data for a variety of bulk uranium-bearing items at the Imperial College Reactor Centre, Ascot. A High Resolution Gamma ray Spectrometry (HRGS) system was used. The technique is based on use of the standard Multi-Group Analysis (MGAU) software which measures the low energy gamma rays from Uranium. Measurements were performed at the Imperial College Reactor Centre in Berkshire, UK.

Key Drivers:

Imperial College's key requirement for this project was to ascertain the ^{235}U enrichment on a variety of Uranium items. Robust historical inventory data was not available and so measurements were needed to provide essential nuclear material inventory data to determine the options for future storage / treatment of these items.



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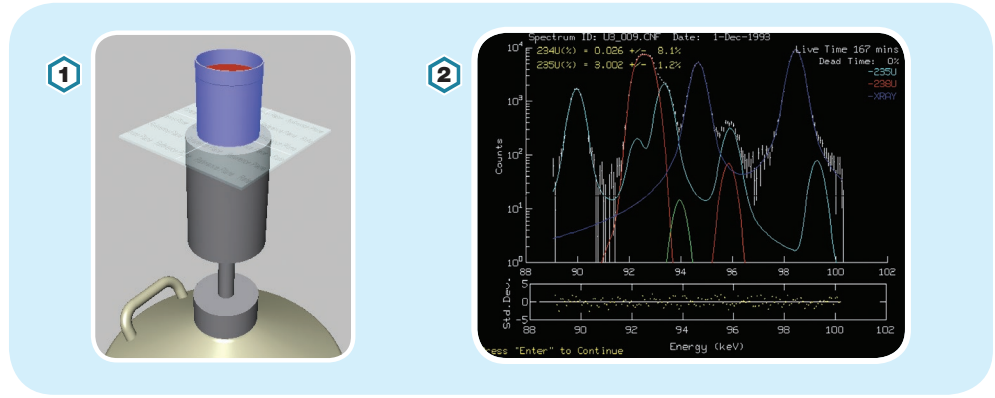
MIRION
TECHNOLOGIES

Measurement of ^{235}U enrichment for a variety of Uranium items

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Instruments & Techniques Used:

- 1 Instruments**
 - ISOCS™ (collimated BEGe detector)
- 2 Software**
 - Multi-Group Analysis (MGAU) software



CANBERRA™ Solution:

In order to perform non destructive assay work on site, the CANBERRA solution to Imperial College's key drivers included:

- Setup and mobilization of portable HRGS equipment configured with MGAU analysis software.
- Development of complete step by step procedures.
- Verifying the system calibrations with actual QC standards.
- Performing a non-destructive measurement of the entire item volume to identify the Uranium nuclides responsible for the gamma emissions and determine the ^{235}U enrichment value.
- Reporting the relative abundances of the uranium isotopes in the items.

A CANBERRA spectroscopy specialist visited the site and carried out the measurements. Data analysis and reporting was conducted, later, using off-line analysis of the measured spectra.

ACHIEVEMENTS

- The UK measurements team successfully ascertained the ^{235}U enrichment on 11 items and confirmed that 9 were natural and 2 were enriched Uranium. One of the enriched Uranium items was originally identified as being natural Uranium and this aided the Reactor Centre in the re-classification of the item. The work also provided essential data to allow the Imperial College Reactor Centre to update their inventory records.

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