

# Method Development for Characterization of Uranium in UF<sub>6</sub> Cylinders

## Scope:

This project was to carry out a feasibility study and radiometric method development (with consideration of the physics methodology, measurement geometries and scanning methodology and identification of key indicator nuclides) for discrimination between standard storage cylinders containing UF<sub>6</sub> which is of virgin origin and that which has arisen from reprocessing operations. A High Resolution Gamma ray Spectrometry (HRGS) survey was conducted for 4 type 48Y UF<sub>6</sub> cylinders whose UF<sub>6</sub> inventory has already been sampled and chemically analyzed, in order to test the technique. Our standard In-Situ Object Counting System (ISOCS™) which is an established flexible tool for quantifying the  $\beta/\gamma$  activity content, was employed for these test measurements. This technique is based on computer modeling of the item under interrogation, in order to represent the counting geometry, with no requirement for radioisotope calibration sources. Measurements were performed at the Sellafield Ltd (Capenhurst) site in Cheshire, UK.

## Key Drivers:

Sellafield Ltd required development of a non destructive technique to distinguish between cylinders containing virgin and used UF<sub>6</sub>. This data is ultimately required to provide Sellafield Ltd with essential characterization knowledge to assist in the planning of future operations with regard to potential storage or re-use of the UF<sub>6</sub> material.



This project took place in April 2009.



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