



Pre-OSL: the means to test and optimize the technical operation of the OSL

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An On-Site Laboratory (OSL) is being installed by ITU Karlsruhe at the reprocessing plant of Sellafield. Samples taken by Euratom Safeguards inspectors will be subjected to verification Analysis in the OSL.

In order to gain already some experience prior to starting the actual OSL, a pre-OSL was integrated in the analytical laboratories of the Institute for Transuranium Elements (ITU) in Karlsruhe.

The pre-OSL is equipped with the same instrumentation and operates the same analytical techniques as the OSL. Samples of nuclear material are analysed in the pre-OSL using techniques like the Hybrid K-edge, neutron/gamma counting, isotope dilution mass spectrometry, potentiometric titration and COMPUCEA (Combined Product Uranium Concentration and Enrichment Assay). The analyses are performed under routine conditions. This serves mainly two purposes:

1. Training of staff in using the individual measurement techniques and operating the instrumentation. Permanently testing and improving the skills of the "inspector-analysts" is a major goal of the pre-OSL.

Familiarization with the highly sophisticated instruments and the software are the essential technical basis for operating the laboratory.

In addition, a number of procedures that are essential for the operation of the OSL can already be tested. The flow of information within each team of analysts, the communication between the weekly shifts and the understanding of the laboratory as an entity can be optimized.

2. Testing and optimization of measurement equipment under routine conditions. As the OSL will have to analyze more than a thousand samples a year emphasis has been given to laboratory automation and improved NDA (Non Destructive Assay) techniques. These novelties have been implemented in the pre-OSL. In an iterative process they were tested, evaluated and adapted to the specific needs of routine safeguards analysis. For example: Robotized sample preparation for mass spectrometry was developed and validated for application. The fully automated procedure now comprises sample spiking, chemical separation of U, Pu and the fission products, preparation of target for alpha spectrometry, recording and evaluation of alpha-spectra, preparation of filaments for thermal ionisation mass spectrometry.

In addition to the actual sample measurement, also the data handling needed to be tested. As the OSL cannot make use of the informatics system that had been in use at ITU for many years, a number of new programs were developed. These are aimed at simple and safe data transfer within the OSL. The various modules of this package were implemented in the pre-OSL. For several months the software was evaluated and finally approved and released.

The OSL will have to operate in a certain independence from ITU structures and management. Therefore the teams will have to cope with a number of aspects of the laboratory and the analysis on their own. The pre-OSL aims at preparing the inspector-analysts to a maximum for the work in the OSL.