Introduction

IAEA holds a unique position in early detection and verification of non-proliferation. Part of the IAEA mission is to “verify through its inspection system that States comply with their commitments under the Non-Proliferation Treaty and other non-proliferation agreements, and to use nuclear material and facilities only for peaceful purposes”.

To this aim, assistance is provided by the Safeguards Analytical Laboratories (ESL and NML), as well as a worldwide network of laboratories (NWAL) towards the goal of verification of correctness (destructive analysis) as well as the completeness (bulk and particle analysis) of a State’s declarations.

Particle analysis is crucial for detecting undeclared activities. Micrometer-sized artefacts are extracted from Environmental Swipe samples (ES) and analyzed using a variety of techniques.

Instruments at IAEA used for micro- and ultra-micro-analytical investigations are:

1. LG-SIMS (Large Geometry Secondary Ion Mass Spectrometry);
2. TIMS (Thermal Ionization Mass Spectrometry);
3. ICP-MS (Inductively Coupled Plasma Mass Spectrometry);
4. LA-ICP-MS (Laser Ablation ICP-MS); and
5. SEM (Scanning Electron Microscopy).

ES Life Cycle

Expansion of IAEA Capabilities

Capabilities that must be developed or sustained (Department of SG Long-Term R&D plan 2012-2023):

- Analytical Capabilities
- Deployed Systems Capabilities
- Operational Capabilities
- Readiness Capabilities

By continuously strengthening information analysis, modernizing the Agency’s information systems, developing requisite skills and abilities for safeguards staff, enhancing capabilities for characterizing nuclear material and environmental samples, the IAEA facilitates the verification process and is faster at drawing safeguards conclusions.

References and Acknowledgements