Validation of the new software for in-field uranium concentration and enrichment measurements by "COMPUCEA"

Abstract:
COMPUCEA (Combined Procedure for Uranium Concentration and Enrichment Assay) is used to support physical inventory verifications (PIV) at uranium fuel production facilities by high-accuracy in-field uranium concentration and enrichment measurements. The COMPUCEA procedure was developed by the Institute for Transuranium Elements (ITU) and its present version is in routine use for EURATOM inspections in Europe since 2007. In 2011 it has been authorized by the International Atomic Energy Agency (IAEA) and it is used by the IAEA for PIV campaigns in Kazakhstan. In order to improve the robustness of the COMPUCEA measurement procedure, new software was developed by the IAEA. The new software guides the user through the sample preparation process and provides a user-friendly interface for calibration, sample evaluation and quality control. Its development started in 2011 and since then it was constantly tested and refined to reach its current stage. In addition, some improvements of the analytical procedure were implemented in the new software. It was tested and validated by ITU to authorize its use for measurement campaigns at fuel fabrication plants and for analyses in ITU. The results calculated by the new software agree very well with results from the previous software and with results from Thermal Ionization Mass Spectrometry. As the new software makes it much easier to provide high-accuracy analytical results with COMPUCEA, it is planned to be used in field from 2015 onwards.

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