

14-4 Improvement of Pu and U Measurement Reliability

— The First ISO Accreditation of a Testing Laboratory for Nuclear Materials in Japan —

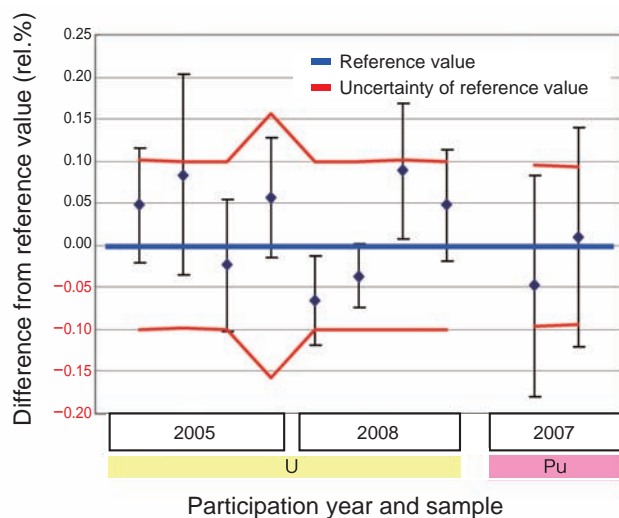


Fig.14-8 Intercomparison results

We participated in the intercomparison program organized by CETAMA, France, which uses reference material as a sample and confirmed our results are accurate and precise compared to the reference value.

(Error bar: Uncertainty of the measurement (95% confidence limit))

Accurate and precise measurement of Pu and U are critically important for safeguards, not only for process control but also for safeguards inspection by the IAEA and the Japanese government at nuclear fuel handling facilities.

The Quality Control Section of the Plutonium Fuel Development Center has been performing quality control in accordance with ISO 9001 requirements and has technically improved the following areas.

- (1) A method was established to estimate Pu and U measurement uncertainty based on the ISO/IEC Guide 98-3 in cooperative research with the NBL of the U.S. Department of Energy, which supplies reference materials internationally.
- (2) We participated in the intercomparison measurement work organized by CETAMA, France, and the NBL, U.S.A., to confirm that our measurement results agree with reference values and that the analysis precision is comparable to the major international laboratories (Fig.14-8). The results were very good compared with the International Target Values for Measurement Uncertainties in Safeguarding Nuclear Materials (ITV) of $\pm 0.36\%$ (2σ), for Pu and U content measurement.
- (3) Since the analysis procedures for Pu and U in nuclear fuel materials had not been standardized between laboratories within Japan, development of standard procedures is considered to be an important to improve the reliability of

Pu and U isotopic measurement by MS Pu and U content measurement by IDMS

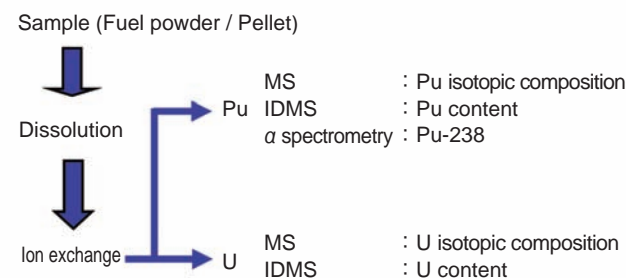


Fig.14-9 Scope of the ISO/IEC accreditation

The scope of the ISO/IEC 17025 accreditation is from receipt of a MOX fuel pellet or its fuel powder to Pu and U isotopic measurement by Mass Spectrometry (MS), as well as content measurement by Isotope Dilution Mass Spectrometry (IDMS).

analysis results in the future. Thus, domestic standard procedures for analytical methods were developed by the "Special Committee on Quality Assurance of Accountancy Analysis for Safeguards" which was established by the Atomic Energy Society of Japan.

With this process, our analysis procedures have been confirmed to be equivalent to the standard procedure.

Based on these activities, as of March 1, 2010, we have been accredited for ISO/IEC 17025:2005 (JIS Q 17025:2005) (International Standard for the General Requirements for the Competence of Testing and Calibration Laboratories) by Japan Chemical Laboratory Accreditation (JCLA) of Japan Chemical Industry Association, as the first testing laboratory for nuclear materials in Japan. The accreditation scope is shown in Fig.14-9.

While ISO 9001 certifies the quality assurance system of an organization, ISO/IEC 17025 accreditation certifies that a laboratory has the capability to perform specific testing. Accreditation by the third-party organization is based on international standards and the reliability of results by an accredited laboratory can be guaranteed internationally.

We will contribute to accurate and reliable accountancy analysis of the nuclear materials at nuclear fuel facilities by consistently reporting reliable analysis results and improve transparency in the use of nuclear materials.

Reference

Sumi, M. et al., Experience on Preparation of LSD Spikes for MOX Samples, Proceedings of the Institute of Nuclear Materials Management, Tucson, Arizona, USA, 2009, Abstract #292, 9p., in CD-ROM.