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Development of a Safeguards Approach for Reference Engineering-scale Pyroprocessing Facility

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A Reference Engineering-scale Pyroprocessing Facility (REPF) concept was developed through a Member State Support Program (MSSP) for the “Support for Development of a Safeguards Approach for a Pyroprocessing Plant”. Homogenization process, which was aimed to make the homogenous powder for the nuclear material accountancy, was included in the head end process. Material Balance Area (MBA)s and Key Measurement Point (KMP)s for the REPF were identified, and the nuclear material accounting method of each KMP was specified. A three-level method was proposed to evaluate the nuclear material accountancy by using Near Real Time Accountancy (NRTA). A simulation program, PYroprocessing Material flow and MUF Uncertainty Simulation (PYMUS), was developed to analyze the nuclear material flow in the facility and to calculate the uncertainty of the Material Unaccounted For (MUF). Measurement errors of each KMP were estimated, and the total MUF uncertainties were calculated with the PYMUS. The safeguardability of the REPF safeguards approach was assessed. The result of this study has been reviewed and tested through the following internal collaboration on the safeguards of the pyroprocessing facility.

Country or International Organization

Republic of Korea

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