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JAEA's Contribution to Development of J-MOX Safeguards System

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Safeguards systems are under development for a large scale LWR MOX fuel fabrication plant (J-MOX) being constructed by Japan Nuclear Fuel Limited. Development of the systems is shared by Secretariat of Nuclear Regulation Authority (NRA) and International Atomic Energy Agency (IAEA). NRA has developed NDA systems including Advanced Fuel Assembly System (AFAS) and Advanced Verification for Inventory sample System (AVIS). These systems were designed and manufactured by Los Alamos National Laboratory under contract with NRA. The AFAS is a NDA system for verification of the LWR MOX fuel assembly and it applies a new technology to measure active lengths of the assembly by neutron detectors without inspector's attendance. The AVIS is a NDA system for verification of MOX bulk material and it is expected to make measurements with bias defect level for many verification samples in short order due to J-MOX's large throughput. Because the AFAS applies the new technology and the AVIS requires bias defect level accuracy, inspectorate recognizes the importance of demonstrating system performance before the installation to J-MOX and confirming effectiveness of safeguards approach. Plutonium Fuel Development Center of Japan Atomic Energy Agency (JAEA) has developed various NDA systems to quantify the plutonium in MOX samples such as pellet and assembly in MOX fuel fabrication facilities. JAEA has knowledge and experiences obtained through the development of the NDAs and testing fields to demonstrate system performance of AFAS and AVIS. Based on the commission from NRA and Nuclear Material Control Center (NMCC), JAEA has conducted the demonstration test of the AFAS and AVIS by using MOX materials at JAEA's MOX fuel fabrication facilities. Through the test, JAEA has contributed to development of J-MOX safeguards systems by demonstrating that the system performance of the AFAS and AVIS satisfies requirements by IAEA.

Country or International Organization

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