SPEAKER / PRESENTATION INFORMATION

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Biography	Yuichi Yamane (B.S., Physics, 1990; M.S., 1992; and Ph.D., 1995, Applied Physics, Nagoya University, Japan) is an assistant principal researcher of criticality safety for the Japan Atomic Energy Agency (JAEA). His research interests include criticality accident analysis methods and subcriticality monitoring methods.		
Title	***JAEA's Effort and New Program for Criticality Safety of Nuclear Fuel Facility***		
Abstract	JAEA has constructed two types of cores, STACY and TRACY, for the criticality safety of domestic fuel processing facilities and has systematically collected criticality data of uranyl nitrate solution since 1995. STACY, STAtic experiment Criticality facilitY, was used to measure the criticality amount of uranyl nitrate solution and to develop subcriticality monitoring methods. The experiments were done with a cylindrical or slab core, a coupled core, and an inhomogeneous core with or without a water reflector. The criticality height was measured for 10%-enriched uranyl nitrate solution with concentration under 500gU/L. A 6%-enriched uranyl nitrate solution and less than 500 fuel rods were used for the inhomogeneous core. The data are used as the benchmark data of ICSBEP and the second edition of the criticality handbook data collection. The subcriticality monitoring method using inverse kinetics or the noise method was developed. TRACY, TRAnsient experiment Criticality facilitY, was used to collect the power, temperature, and pressure profile data for spontaneous or ramp insertion of up to 3$ reactivity in order to understand criticality accident phenomena and to develop the evaluation method for its consequence. The 10%-enriched uranyl nitrate solution with 365 to 433 gU/L concentration was used in a 50-cm-diameter cylindrical tank with or without a 50-cm-thick water reflector. The one-point kinetics code AGNES was developed based on the data, and the information from the TRACY experiment helped decide the action at the JCO criticality accident and develop and perform the criticality accident evaluation of the MOX powder process. Lowering the total cost of nuclear electricity demands the longer periods of operation and higher uranium enrichment, so the feasibility study of the fuel cycle system of over 5% enriched uranium fuel becomes much more important. It is also necessary that the criticality safety study include burn-up credit for fuel processing, transportation, reprocessing, and storage. According to the experiment program for research on nuclear criticality safety of fuel cycle and development of advanced light water reactors, the conceptual design of critical core conditions using fuel rod assemblies is ongoing. Using the modified experimental core, the fundamental critical characteristics and kinetic parameters of heterogeneous cores with wide moderating ratio and fuel conditions will be studied. For the licensing procedure, safety designs for the reactivity control system have been performed. Typical calculation results of basic properties for the planned core will be presented.		