Contribution ID: 55

Type: Oral Presentation

The study and analyze the operation of the Bandung TRIGA research reactor using plate type fuel elements.

Tuesday 17 November 2015 17:10 (20 minutes)

In order to support the national development program, the National Nuclear Energy Agency of Indonesia has among other duties is to conduct activities of research, development, radioisotope production and utilization of nuclear energy. To carry out these duties, the Bandung TRIGA reactor operation should be considered. Until recently, the Bandung TRIGA reactor still has strategic and economic value, particularly to back-up radioisotope production of the Serpong reactor and to conduct research in the field of reactor physics, reactor thermal-hydraulic, reactor instrumentation, research on neutron activation analysis and other research. Nevertheless, the operation of the Bandung TRIGA reactor is dependent on the supply of standard TRIGA fuel, but the company for fuel suppliers for standard TRIGA reactor does not exist anymore. While on the other hand BATAN Serpong has been able to make its own fuel plate type and it has been used for Serpong reactor. BATAN Serpong has been able to produce plate-type fuel, and it has anability to perform analysis onthermal-hydraulicand neutronic for this type of fuel. It also has experience in the design of control systems and computer-based instrumentation of research reactor; it can be beneficial for BATAN to keep the Bandung TRIGA reactor remain in operation in Indonesia by using fuel plate type. Therefore, BATAN researchers particularly at the Center of Applied Nuclear Science and Technology (CANST) Bandung and some associated centers have plan to make of the Bandung TRIGA reactor conversion by changing the type of fuel rods into fuel-type plate, by using of an artificial BATAN fuel element itself, so the Bandung TRIGA reactor fuel supply does not depend on the standard TRIGA fuel. This activity will also be able to show that the BATAN been able to operate the reactor independently such as Bandung TRIGA reactor. Strategies to achieve results to obtain the type plate Bandung TRIGA reactor fuel is to do some design and analysis, such as reactor core design to get the optimal core. To determine the operating cycle of the TRIGA reactor using plate-type fuel, necessary burnup calculation of each cycle and how to perform core management optimally. Currently being conducted the design of the primary and secondary cooling system of the reactor, the design of the delay tank system, and the design of the reactor instrumentation and control systems. For the cooling system, because the flow of coolant in the reactor core will use the forced convection flow, needs analysis and new design of the primary coolant system. This design is based on the data flow rate is required, so that the design of the reactor primary coolant system produced in accordance with the conditions of the planned reactor core. In the planning the Bandung TRIGA reactor will be operated at maximum power of 2000 kW. A delay tank will be designed to inhibit trips N-16 that will disintegrate before the cooling water back into the reactor tank and N-16 has decayed. Implementation of the program began in 2015 and it was estimated to obtain the final design in 2019. In addition, safety studies related to the project are being performed in order to obtain a new license for the entire facility, not only because of the modifications but also to generate updated regulatory documents, including the safety analysis report. At this time, because BATAN Bandung still has the standard TRIGA fuel, the Bandung TRIGA reactor operated using standard TRIGA fuel to the end of 2018. Because of its FFCR has burned nearly 50%, the reactor control rods will be replaced by using control rods without FFCR. Control rods with out fuel followers have been made in BATAN Serpong and now are in the testing phase.

Keywords: Bandung TRIGA reactor, plate type fuel, FFCR

Organization

National Nuclear Energy Agency (BATAN) of Indonesia

Country

INDONESIA

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Session Classification: Operation and Maintenance

Track Classification: Research Reactor Operation and Maintenance