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Role of BAEC Research Reactor in the Development of Nuclear Science and Power Programs in Bangladesh

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The Bangladesh Atomic Energy Commission (BAEC) has been operating the TRIGA research reactor since September 1986. The BAEC TRIGA Research Reactor (BTRR) is the only nuclear reactor of the country. The reactor has been used for manpower training, education, radioisotope production and various R&D activities in the field of neutron activation analysis, neutron radiography, neutron scattering and experimental research on reactor safety. The BTRR is a light water cooled, graphite reflected reactor, designed for maximum steady state thermal power level of 3 MW and for pulsing operation with maximum pulse power of 852 MW. Center for Research Reactor (CRR) of BAEC is responsible for operation and maintenance of the reactor as well as human resources development in the area of nuclear power program.

Bangladesh government has strong commitment to implement nuclear power programs (NPP) in the country. An agreement was signed on 2 November 2011 between the Government of the Russian Federation and the Government of the Peoples Republic of Bangladesh for the construction of a NPP (2000 MW) on the territory of Bangladesh. On 2 October, 2013 the Honorable Prime Minister, the Peoples Republic of Bangladesh has laid the foundation stone of Rooppur Nuclear Power Project (1st phase) implementation activities. The Rooppur site is north-west region of Bangladesh and this would be the first nuclear power plant in the country. The knowledge and experience gain from operating the research reactor, directly or indirectly can support the development and implementation of nuclear power programs. The experience from managing nuclear material at research reactors promotes a better understanding of the infrastructure and issues that need to be addressed in the field of nuclear power programs.

Nuclear reactor technology related training and education program has been extended to provide necessary supports to the students undertaking nuclear engineering courses in various public universities of the country. Conducted different practical experiments at the CRR on the following topics: Measurement of radiological safety parameters; reactor operation and maintenance; Thermal hydraulics related experiment; measurement and study of reactor physics and nuclear safety parameters; calibration of different reactor safety related equipment; study on digital I&C systems and reactor safety related equipment, etc.

The reactor facility along with the associated laboratories has been used successfully for carrying out routinely thesis works in the field of nuclear science and technology of B.Sc./MSc./MPhil/Ph.D. students from different public universities of the country. The reactor facility has been used for training and retraining programs of the reactor operating personnel (including foreigners) to the level of Senior Reactor Operator (SRO) and Reactor Operator (RO). The facility also arranges several practical experiments on nuclear safety related parameters for the participants of different training courses such as Basic Nuclear Orientation Course (BNOC) as foundation training course of the newly appointed scientists and engineers, Fundamental course on nuclear power plants, Follow-up Training Course on reactor engineering, etc.

For enhancement of utilization of the reactor, a strategic plan has been developed for BTRR. The plan has identified facility's strengths, achievements, weaknesses, opportunities and threats, strategic issues and prepares a time bound action plan for achieving the goals. BAEC with its limited resources is always trying hard to strengthen the safeguards and physical protection programs around its research reactor and associated facilities. The BAEC plays a leading role in the planning, implementation, and evaluation of the nuclear safeguards and security activities in different nuclear and radiological facilities (e.g., Research Reactor, Central Waste Processing and Storage Facility (CWPSF), 60Co source of the Institute of Food and Radiation Biology of AERE and Radiation Oncology Centers in the country.

There are 19 issues consider in infrastructure building for NPP. Most of these issues are common for NPP and research reactor. BAEC has been operating a research reactor for about 3 decades. The major potential areas of research reactor contribution to the building for NPP are: Nuclear safety, regulatory activities, safeguards, radiation protection, human resource development environmental protection, emergency planning, security and physical protection, nuclear fuel handling and storage, radioactive waste, etc. Most of these issues are handling by the BAEC and regulatory personnel successfully. The supporting infrastructures, experience and expertise by the existing research reactor would be helpful for taking knowledgeable decision regarding NPP.

Research, education and human resource development programs enhance significantly with view to implement the NPP. BTRR is playing an important role for human resources and infrastructure development for nuclear science and nuclear power programs in the country.

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