

## Current Status of Operation and Utilization of Dalat Nuclear Research Reactor and Strategic Plan in the Next Decade

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Dalat Nuclear Research Reactor (DNRR) with the nominal power of 500 kW is today the unique one in Vietnam. The reactor was reconstructed and upgraded from TRGA Mark II research reactor, and restarted operation on March 20, 1984. Under the framework of the program on Russian Research Reactor Fuel Return (RRRFR) and the program on Reduced Enrichment for Research and Test Reactor (RERTR), the project for full core conversion of the DNRR from high-enriched uranium fuel (HEU) to low-enriched uranium fuel (LEU) was implemented during years 2008 - 2012. Since January 2012 the reactor has been operated with a working core configuration consisting of 92 VVR-M2 LEU fuel assemblies of 19.75% enrichment.

Up to mid 2015, the reactor has been operated with the total of about 40,250 hrs of safety and effective exploitation. During the last 31 years of operation, the DNRR was efficiently utilized for: (1) Producing about 400 Ci per year of radioisotopes including I-131, P-32, Tc-99m generator, Cr-51, Sm-153 for medical use; (2) Developing a combination of nuclear analysis techniques (INAA, RNAA, PGNA) and physic-chemical methods for quantitative analysis of about 70 elements and constituents in various samples of geology, crude oil, agriculture, biology, environment; (3) Carrying out experiments on the reactor horizontal beam tubes for nuclear data measurement and nuclear structure study; and (4) Contributing on nuclear education and training programs for human resource development in the country.

In the next ten years, the DNRR will be considered to implement the operation regime of 150 hrs/cycle in order to increase the quantity of radioisotope production as well as the number of irradiation samples for NAA. The use of the reactor for nuclear education and training in order to support the human resource development for the national nuclear power program will be also paid much attention. Besides, in preparation for the effective utilization of a new research reactor in future, the broadening of researches on production of various radioisotopes (such as Mo-99, Y-90, Ho-166, Lu-177 and Ir-192), neutron radiography and gemstone coloration will also be planned to carry out at the DNRR. As the high power research reactor puts into operation between 2023-2025, the DNRR will shift its utilization purpose and mainly use for NAA, basic researches, and education and training.

This paper presents the current status of operation and utilization of the DNRR. In addition, the strategic plan for the reactor in the next decade is also mentioned in the paper.

Keywords: DNRR, HEU, LEU, RRRFR, RERTR, VVR-M2, NAA, INAA, RNAA, PGNA, BNCT.

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