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# Current Status of the DNRR and Conceptual Design of New Research Reactor Using LEU Fuels with High Power and Multi-Purpose

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## ABSTRACT

The Dalat Nuclear Research Reactor (DNRR) has been successfully converted from HEU to LEU fuel since 2012 and it is good condition of operating at 500 kW. The reactor is mainly used for radio-isotope productions, neutron activation analysis, basics research and training. Until now, the safety operation time with LEU fuel was total about 9000 hours, about 1500 Ci of I-131 and P-32 were produced, more than thousands samples were irradiated for analys and a lot of experiments for nuclear physics study were performed. . The characteristics and thermal hydraulics limitation during operation have met safety requirements of the fuel supplier. The experimental devices used for training and research on the reactor have been also upgraded. The status operation and utilization of the DNRR is given in this paper. And the paper also presents the preliminary results of conceptual design calculation for a new research reactor with power 10 MW for the country in the near future. Three LEU fuel types including VVR-KN, IIRT-4M and MTR-M and different reflector materials such as beryllium, graphite and heavy water have been considered in design calculation. The main structures of the new research reactor were determined based on on advanced new research reactors in the world in which the
vertical irradiation facilities and horizontal beam tubes were determined for traditional and modern applications. The comparative analyses among different fuels and reflector materials were performed to determine the strong points and weakness of each reactor core configuration in the viewpoint of safety operation and effective utilizations of the new research reactor.

***Keyword:*** Status of the DNRR, , Research Reactor, design calculation, VVR-KN, IRT-4M, MTR-M, computer codes.