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**Preliminary results of design calculation for research reactor
using VVR-KN fuel with nominal power 10 MW**

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ABSTRACT

The Dalat Nuclear Research Reactor has been successfully converted from HEU to LEU fuel since the end of 2011 and the reactor is currently operating at a power of 0.5 MW. Because the reactor has a limitation in power level, neutron flux for utilization, old design as well as aging problems, it cannot meet the increasing demands for applications and utilizations. So the new research reactor using VVR-KN fuel and operating at 10 MW is being designed in conceptual phase. The reactor's compact core dimension with one layer of beryllium rods around the periphery and the reflector having graphite and beryllium material was established. Six core configuration fuel cycles to be used with 9 control rods were determined together with detailed investigation of neutronics, thermal hydraulics characteristics and safety analysis in reactivity insertion accident, primary pump breakdown and loss of electric power supply. The results obtained from calculation by using computer codes show that all six cycles met safety requirements and utilization metrics such as radioisotope productions, silicon doping, material testing and study, etc.

Keywords: VVR-KN, design calculation, neutronics, thermal hydraulics, safety analysis.