

**RERTR 2016 – 37TH INTERNATIONAL MEETING ON
REDUCED ENRICHMENT FOR RESEARCH AND TEST REACTORS**

**OCTOBER 23-27, 2016
RADISSON BLU ASTRID HOTEL
ANTWERP, BELGIUM**

**Current State of Conversion of the IGR Reactor and
IVG.1M Reactor to LEU Fuel**

A. Vurim, E. Batyrbekov, M. Skakov

National Nuclear Center, Republic Kazakhstan, Krasnoarmeyskaya St., 10, 071100, Kazakhstan

ABSTRACT

In 2010 the National Nuclear Center of Kazakhstan has initiated the program on conversion of its research reactors.

To date the feasibility study has been performed for choosing engineering solutions in support of conversion of IGR and IVG.1M research reactors to low-enriched fuel (LEU).

Neutronic calculations and thermal analysis were performed using complex 3D reactor model in order to determine how conversion of the reactors affects their parameters. Neutronic parameters were calculated using neutron transfer program (MNCP code). To those are thermal neutron flux and fast neutron flux; their distribution throughout the reactor; reactivity; performance of the components of the Control and Protection System; effective multiplication factor; neutron lifetime; energy release; velocity of fission, absorption and activation reaction. Given results provided the basis for calculation of burnout, poisoning and isotope change as a whole.

The paper demonstrates the feasibility of IVG.1M reactor conversion from technical point of view given updating of the reactor engineering systems, foremost information & instrumentation system, control and protection system, power supply system and dosimetry control system.

NNC has now performed analysis of IGR reactor conversion which showed that the performance of the LEU core is degraded if the core is hot. Now, the search for optimized solution for IGR conversion is under discussion.

The samples of experimental LEU-fuel have been already delivered to IVG.1M and IGR reactors' sites and they are ready for in-pile and out-of-pile tests.

In addition to those, samples-fragments of inner IGR-LEU reflector which supposedly may be fabricated from beryllium oxide (BeO) have been delivered to IGR site to further tests.

NNC conducted inspection control for experimental LEU-fuel; performed preparation tests which conformed that the fuel is suitable for testing.

Pilot samples of technological channels WCTC-LEU have been loaded into the IVG.1M reactor to conduct life cycle tests.

LEU samples and BeO samples will be tested in transient-of-power in the IGR and in the life cycle tests based on VVER-K reactor.