

WWR-M RESEARCH REACTOR STATUS



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WWR-M research reactor at KINR was commissioned in 1960. Since that date the reactor worked in an isotope production, nuclear power industry support, and different areas of theoretic and applied science. In 2011 the reactor core conversion programme has been completed and reactor starts operate on LEU fuel.

The reactor licence obtained during core conversion was expired. The reactor personnel during past few years have been focused on renewing the reactor licence. A lot of work including partly primary pipeline replacement, safety and strength calculations and researches has been performed. Periodic Safety Review and stress tests using last IAEA safety recommendations have been completed. This PSR has been analysed by independent organizations and approved by regulatory body. All mentioned documents have been created on the base of IAEA safety standards and recommendations.

The new strength calculations have been provided. Those calculations include the elements inside reactor vessel, reactor primary loop and all reactor structures and components important to safety. Calculations of reactor vessel and its components have been done on the basis of the mechanical tests of aluminium alloy irradiated samples.

After safety reassessment the additional safety measures have been developed and implemented on the reactor. Those measures includes new and updated safety and maintenance procedures, purchasing and install the additional equipment such as gasoline pumps for emergency cooling system, additional power cables for emergency power system and so on.

All updates and results of calculations have been included in the SAR. The new SAR has been approved by regulatory body.

Ageing management

The main objective of the ageing management program is establishing the scope and consistency of the organizational and technical measures to ensure the systematic and effective management of ageing buildings, equipment and pipelines of WWR-M reactor primary cooling system, which should serve as a basis for the extension of their operation. Other reactor systems (like instrumentation and control system) which are important for reactor safety have been replaced or previously reengineered; therefore, their lifetime is not exhausted.

Ageing management

During the reactor normal operation the personnel task is to control and record the neutron fluence (aluminium alloy has a fluence margin $> 3.6 \cdot 10^{26}$ n/m²), perform and document the results of periodic visual inspection of the accessible places, the vessel surface (inside), bottoms, horizontal channels bottoms and core support grid plate.

Fluence is calculated regarding to the reactor power, which is recorded in the appropriate technical documentation and a visual inspection is carried out according to the schedule (once in 2 years).

Ageing management

To ensure timely detection of the problems concerning violations of the of primary loop tightness limits the visual inspection of the most stressed sections of the reactor vessel and core support grid is regularly carried out. The strength calculations of the reactor vessel and the core support grid have been provided.

Ageing management

For conducting reactor vessel metal strength tests and calculating the strength of the vessel together with its components the following work has been done:

- analysis of the results of the irradiated samples (made from the same material as reactor vessel) strength tests;
- analysis of the reactor vessel metal corrosion;
- analysis of the reactor vessel and its elements strength calculation results;
- analysis results of research and studies of the most strenuous reactor vessel parts under neutron irradiation conditions.

WWR-M reactor now got the operating licence till 2023. The reactor is going to produce radio isotopes, work to support nuclear power industry, irradiate gems and continue scientific researches. The work under RRRFR programme will be continuing. The LOE fuel developed for the critical facility in Kharkiv will be tested there.

Thank you for attention