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SNF management in Russia : status and future development

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At present, Russia's nuclear power industry continues its development and increases its contribution to the overall energy mix, which reached 18.9% in 2017. The basis of nuclear power generation is formed by LWR, in the same time Russia operates two industrial-size fast reactors –BN-600 and BN-800. It is expected that from the year 2030 there will be the large-scale implementation of fast neutron power reactors and the transition to a two-component nuclear system with unified fuel cycle, linking the needs of both existing thermal reactors and fast neutron reactors. Solving the problems associated with the accumulation of SNF and radioactive waste in this regard is becoming a priority.

As a basic approach to SNF management in Russia, the concept of its reprocessing with the nuclear materials recycling in a two-component nuclear power energy system (with thermal and fast neutron reactors) has been adopted. The main purposes are an efficient use of natural uranium resources, SNF non - accumulation, recycling nuclear materials, and reducing the radiotoxicity and volume of the generated radioactive waste.

Russia has many years of experience in safe management of spent nuclear fuel from power reactors including storage, reprocessing and recycling . The reprocessing plant RT-1 has been operating since 1977. To date, over 6,000 tons of SNF have been reprocessed. At the same time, a integrated complex for SNF management is being created at the site of the Mining Chemical Combine, which includes: centralized water cooled ("wet") SNF storage; centralized air-cooled ("dry") SNF storage; a pilot-demonstration centre for the reprocessing of SNF based on innovative technologies; MOX fuel fabrication for fast neutron reactors (BN-800 type). An underground research laboratory will be set up here to develop the technologies for the HLW final isolation. The recycling of repU is currently being fully implemented during the fabrication of fuel for thermal reactors. Separated plutonium from LWR SNF starts involving in NFC as a component of MOX fuel for FR (for starting loading and feeding during the first 10 years of operation of fast reactors). At the same time, the technology of multi-recycling in thermal reactors of plutonium and repU from LWR SNF is being developed (REMIX-concept).

To reduce radiotoxicity and the volume of ultimate wastes to be disposed of, HLW partitioning technologies are being developed with MA and heat-generating fission products recovering. Russia already has industrial experience in HLW partitioning.

The technology of MA transmutation is planned for studying using both solid-fuel fast reactors (like BN-800 type) and MSR.

Do you wish to enter the YGE SFM19 Challenge?

Yes

Country or International Organization

Russian Federation

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