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Atomexpo-2016

State atomic energy corporation "Rosatom"

The spent nuclear fuel management in a closed fuel cycle of two-component nuclear power system with LWR (VVER) and FR (BN)

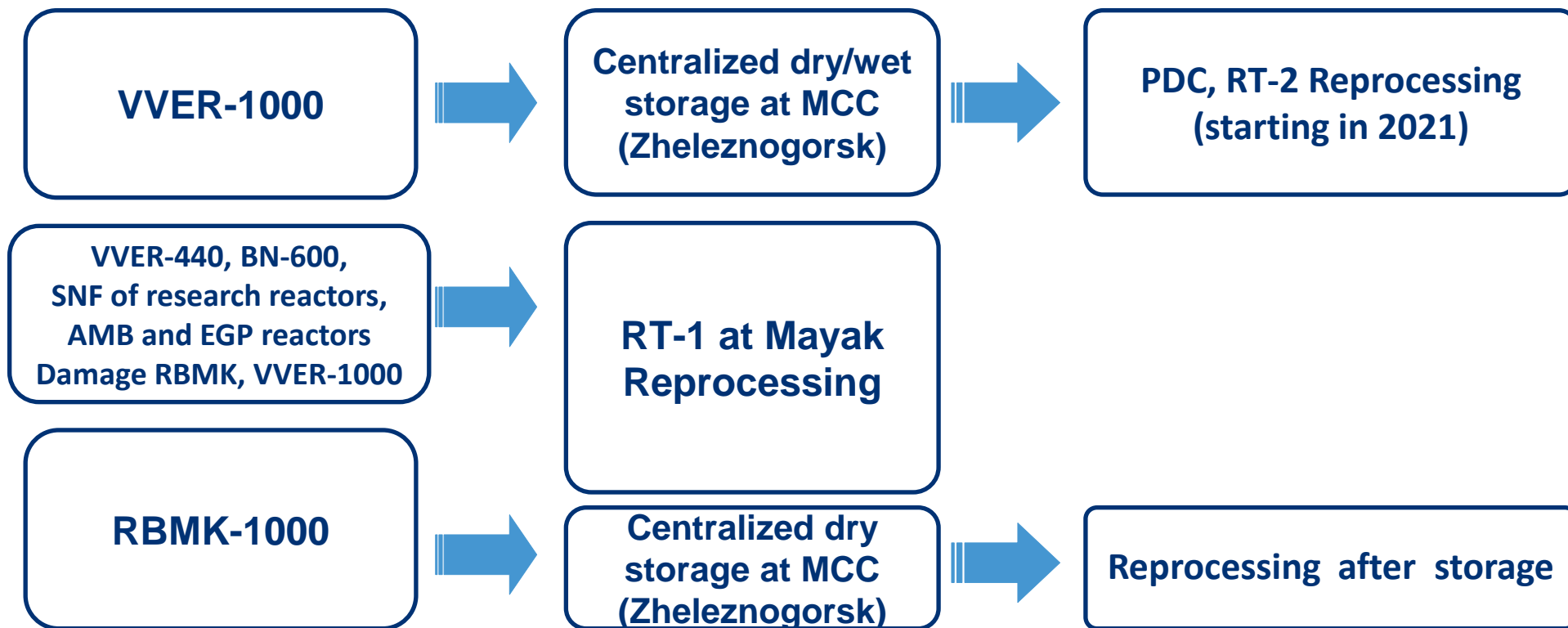
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# Technologic Patterns of SNF Management: Reprocessing is a basic method of SNF management



The basis of the Russian Federation policy in the area of SNF management is the principle of **SNF reprocessing** in order to ensure ecologically acceptable management of nuclear fission products and return of the regenerated nuclear materials into the fuel cycle. The strategic areas in SNF management are establishment of a reliable system for long-term controllable SNF storage, development of SNF reprocessing technologies, balanced involvement of the SNF regeneration products into the nuclear fuel cycle, final isolation (disposal) of radioactive waste generated after the reprocessing.

Storage technologies: from 'wet' to 'dry' SNF storage –

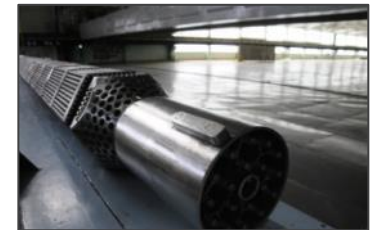
Technologies of reprocessing and new fuel fabrication:  
MOX and REMIX fuel.



Transition to passive safety systems of SNF storage



SNF reprocessing; from the 1<sup>st</sup> generation plant to the 3<sup>rd</sup> generation plant. Absence of radwaste releases. Minimisation of radwaste to be disposed of.

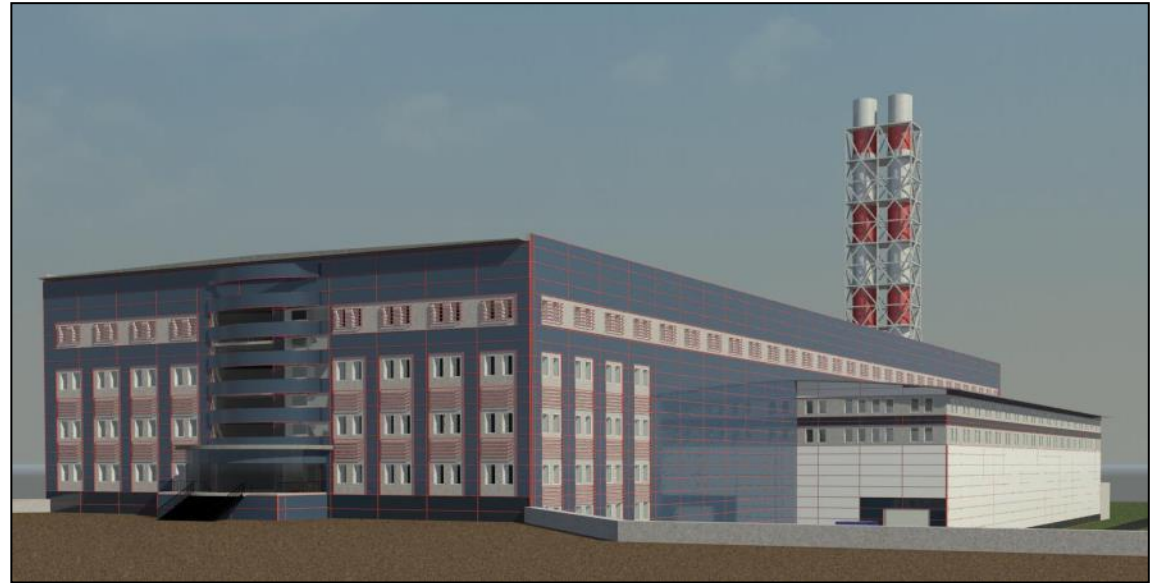


Start to recycle nuclear materials in thermal and fast reactors

# Development of key technologies

## SNF Reprocessing Pilot Demonstration Centre

**The PDC** – an innovative reprocessing plant of the third generation – no RW release.



Construction of the 3<sup>rd</sup> generation SNF reprocessing complex at MCC

- 2016** – commissioning of a start-up complex of research hot cells. Confirmation of new technologies for reprocessing SNF from both thermal and fast reactors.
- 2020** – commissioning of the next start-up complex: for reprocessing SNF from VVER-1000 reactors. The capacity of the complex will be up to 250t of SNF annually.

MOX fuel fabrication industrial plant was constructed at MCC in 2014.

For Russia, this is the first step towards commercial involvement of the plutonium potential into the nuclear fuel cycle by closing the nuclear fuel cycle at BN-800 fast neutron reactors.



System for fuel pellets sintering,  
MOX fuel fabrication



System for assembling fuel rods into  
the final fuel assembly structure

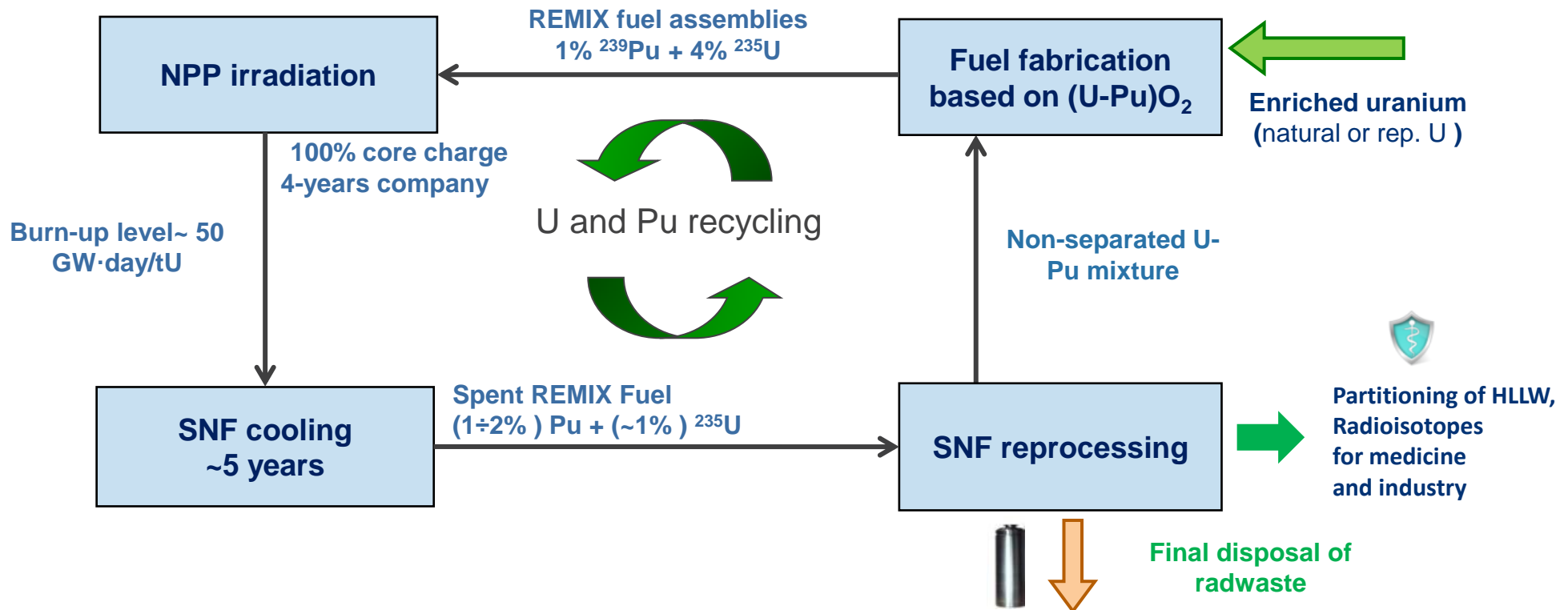
# Development of key technologies

## REMIX fuel - plutonium multi - recycling in thermal reactors (VVER-1000)



REMIX fuel is the non-separated mixture of U and Pu from LWR SNF reprocessing, with the addition of enriched uranium (natural or rep. U )

REMIX fuel enables multiple recycling of the entire quantity of U and Pu from SNF, with the 100% core charge and 20%- saving of natural uranium in each cycle.





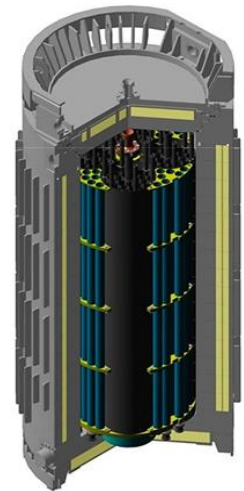
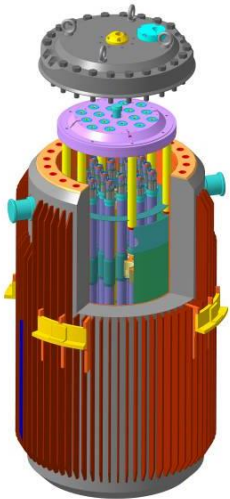
## MCC

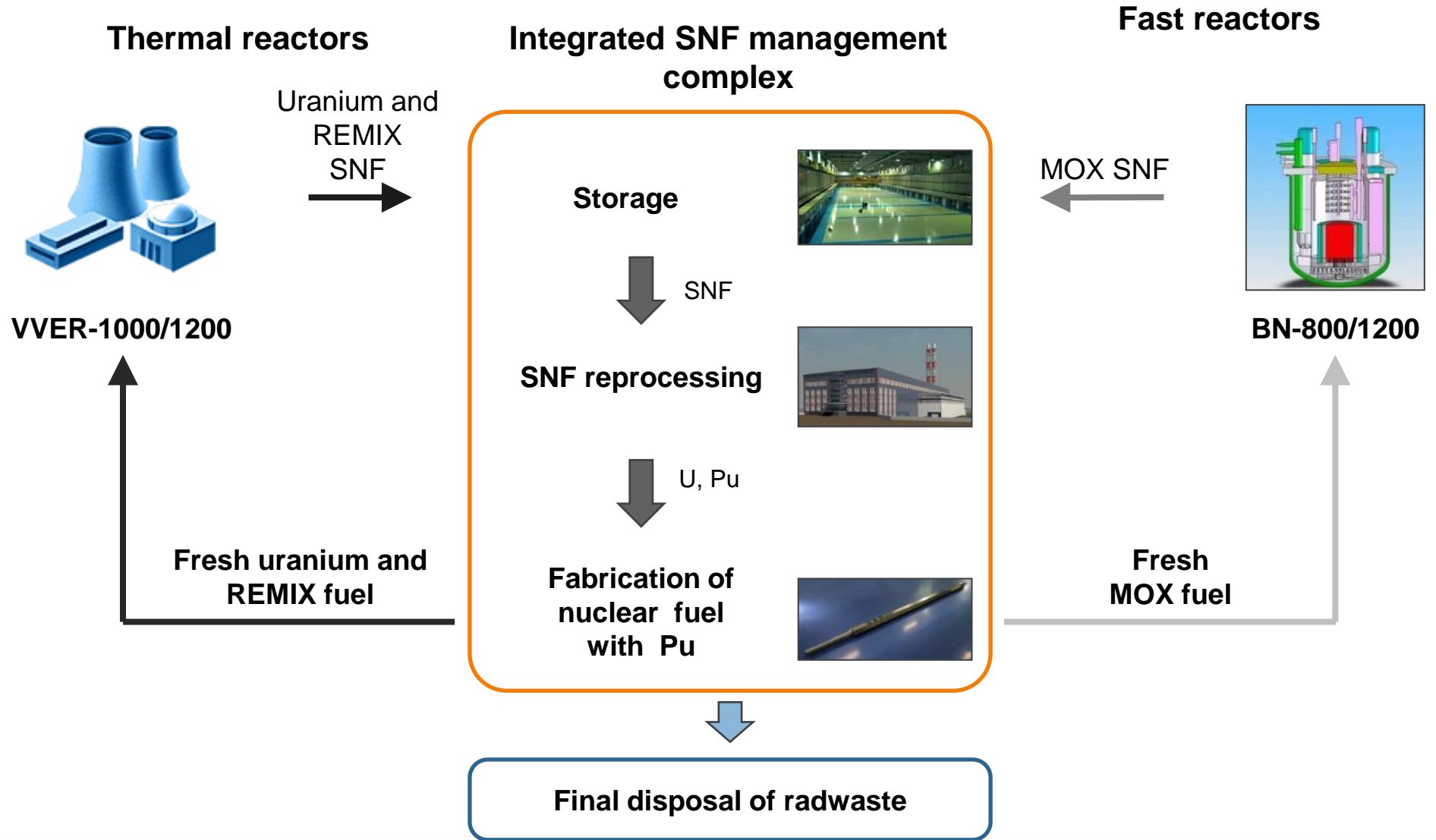
- The basic technological line of the PDC- reprocessing SNF BN-800 together with SNF TR
- The complex of research hot cells of the PDC - testing and improvement of reprocessing technologies



## RT-1 "PO Mayak"

SNF BN-800 can be reprocessed together with SNF TR in different technological lines, the separate reprocessing of MOX BN-800 can be organized as well







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