Radioactive waste and spent nuclear fuel management: current challenges

Anzhelika Khaperskaya

State Corporation “Rosatom”, Russia
The current situation in SNF & RW management

Volumes of solid radioactive waste, both in storage and in final disposal

SNF accumulation worldwide

250,000 t of SNF in storage

370,000 t of SF discharged from NPPs worldwide

120,000 t of reprocessed spent fuel

Is the spent nuclear fuel a resource or a waste? Strategic options

National Energy Strategy

- Energy independence
- Domestic reprocessing and recycling capacity
- Security of supply of energy resources
- Large nuclear contribution
- International reprocessing and recycling services
- General national policies on reuse of resources
SNF Direct disposal

SNF is stored for several decades and disposed in a geologic repository
Finland, Sweden, USA, Canada, Germany
Reprocessing & Recycling today

*Reprocessing/Recycling* – SNF is reprocessed, U and Pu reused as fuel in light water reactors or fast reactors – high level waste disposed in a geologic repository.

France, Russia, Japan, India and China (countries with large and ambitions nuclear power programmes).

Monorecycling today - MOX and repU fuel (up to 25% saving of nat U).

Slide have been inspired in the e-learning material on SFM currently under development in the IAEA (NE department).
REMIX fuel – U& Pu multi - recycling in LWR reactors

REMIX fuel is the 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.
Advanced Fuel Cycles

URANIUM DEMAND

- Without recycling: 100%
- Recycling in light water reactors: 75%
- Recycling in fast reactors: 5%

Advanced nuclear system with LWR and FR, recycling U and Pu can provide long term (thousand of years) supply of low carbon electricity
Infrastructure of Advanced Fuel Cycles in Russia

SNF Reprocessing PA Mayak

Energy production - NPPs (LWR, FR)

Fuel fabrication

SNF storage

SNF Reprocessing MCC

U mining

Enrichment and U fuel fabrication

MOX fuel fabrication

U, Pu

REMIX fuel fabrication

Am, Pu, Cm, Np

U, Pu

FR/MSR
Contact information

A. Khaperskaya
State Corporation “Rosatom”
+7 (499) 949-43-44
AVKhaperskaya@rosatom.ru
www.rosatom.ru