



ROSATOM

Technical Meeting on Cost Estimation Methodologies for Spent Fuel Management
IAEA, Vienna, 5 – 8 November 2019

ROSATOM STATE ATOMIC ENERGY CORPORATION

Rosatom Integrated Solution in the sphere of Spent Fuel Management

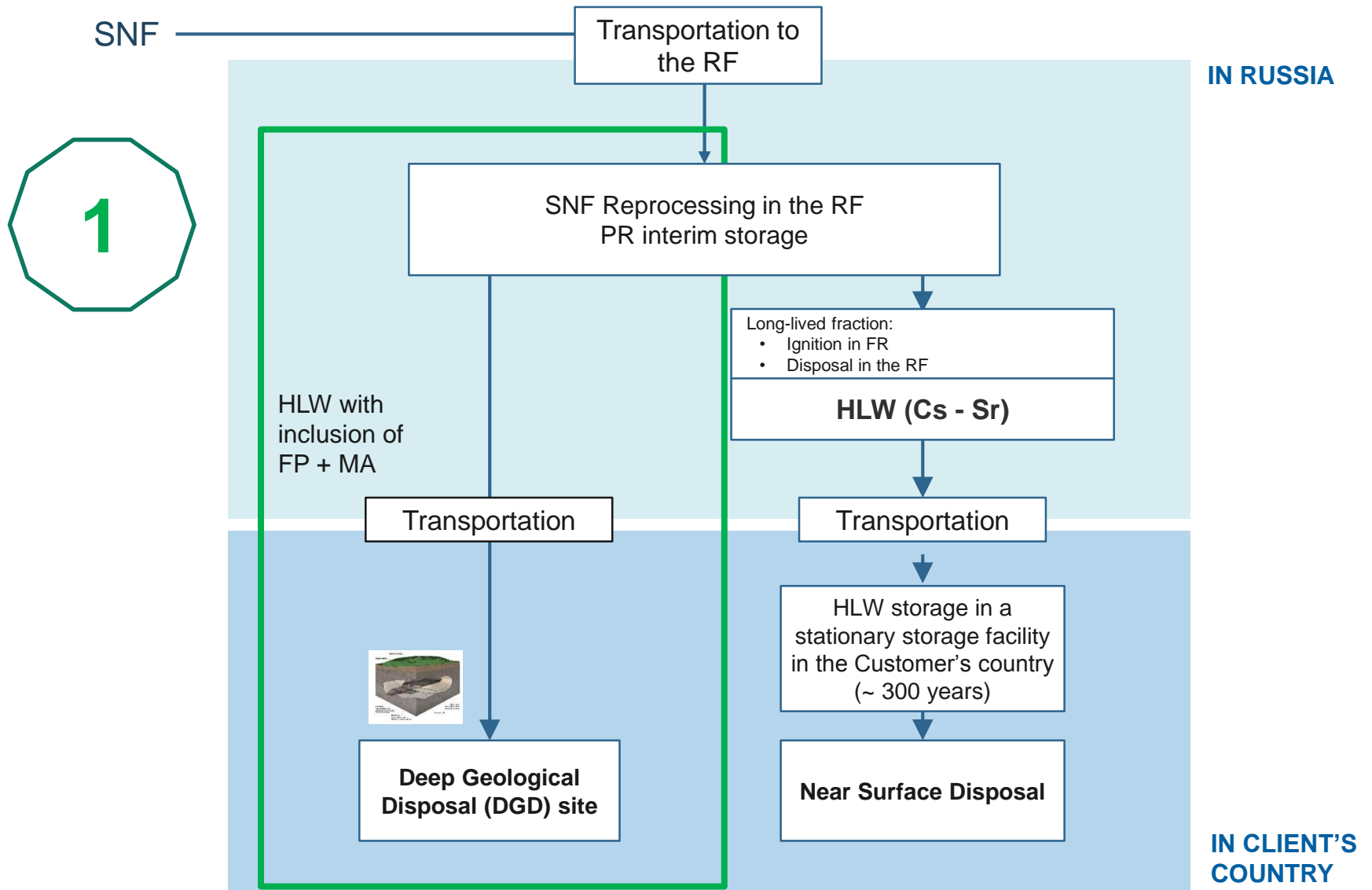
A. Semin – Rosatom Overseas
A. Shchekochikhin - TENEX

November, 2019

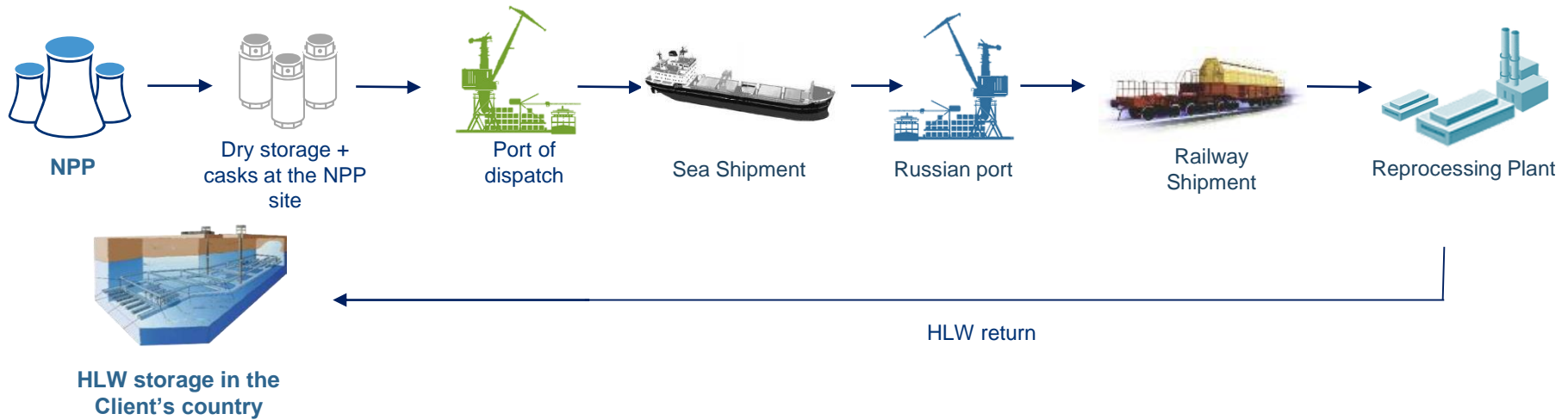



**ROSATOM:
Reference spent fuel management
solution**


Two options of SNF reprocessing





SNF reprocessing with further HLW return




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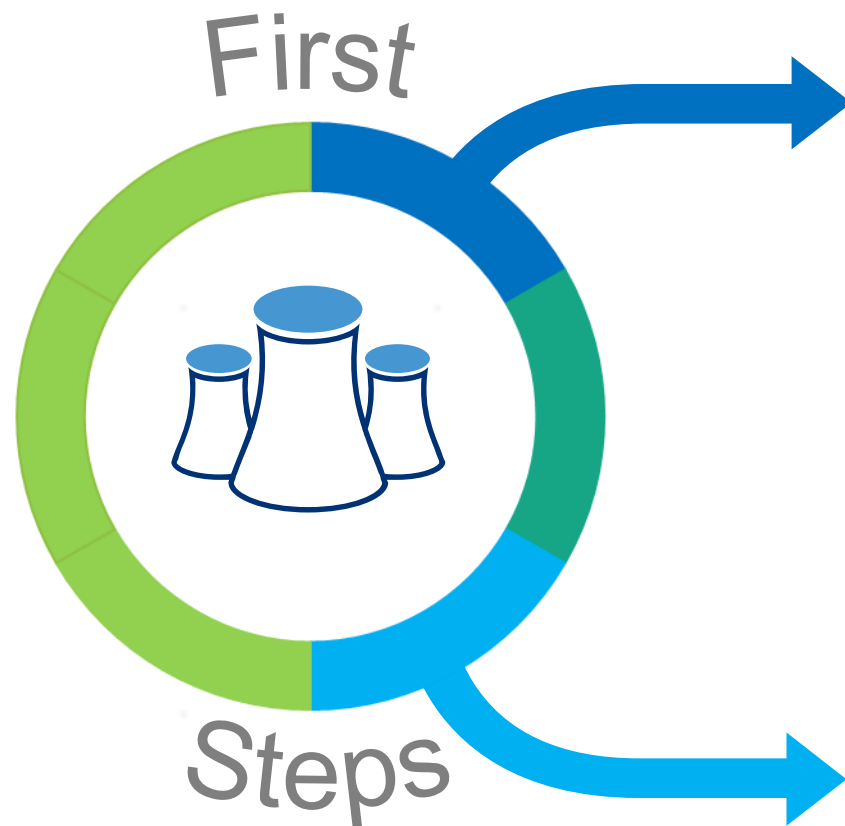
NO SNF ACCUMULATION
(no additional storage facilities)
- 

VOLUME OF ULTIMATE WASTES REDUCTION
- 

NATURAL URANIUM DEMAND DECREASE
- 

THE LONG-TERM RADIATION HAZARD IN DGD
- 

“NEXT GENERATION” ISSUE SOLUTION



**FEASIBILITY STUDY
DEVELOPMENT AIMED AT
CHOOSING CLIENT-
ORIENTED SFM OPTION**

**BASIC SPENT FUEL
INFRASTRUCTURE
DEVELOPMENT:**

- supply of 16 dual-purpose casks
- construction of accumulating area

Why is it important to develop the initial SNF infrastructure in conjunction with NPP construction?

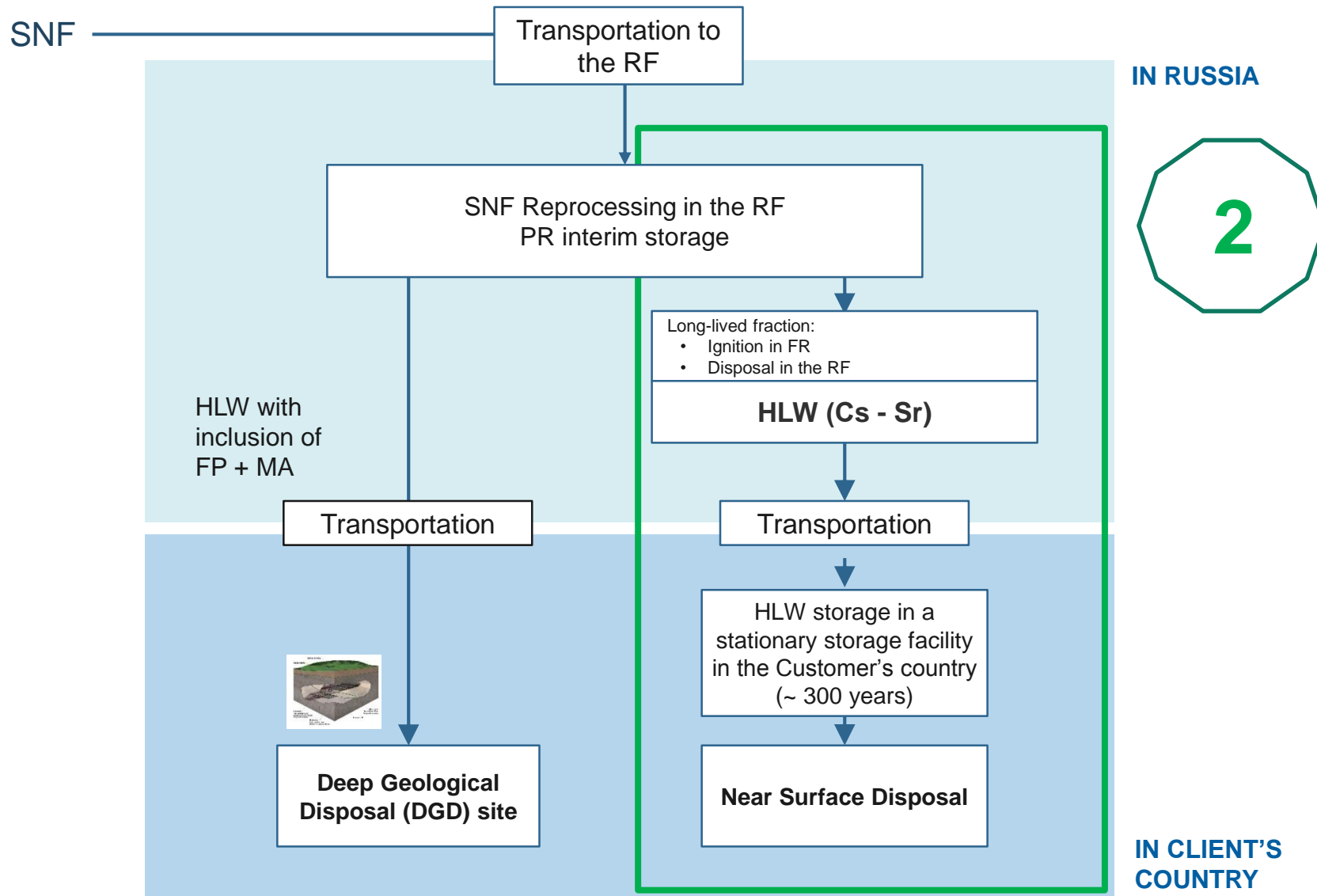


- ✓ Requirement to prove SNF management policy to national regulator and to get NPP construction license
- ✓ Green light to public acceptance of NPP project
- ✓ Avoidance of NPP shut-down because of full SF pool
- ✓ Construction of united utility infrastructure (both for NPP and SNF management facility)
- ✓ Construction of united physical protection (both for NPP and SNF management facility)

Two options of SNF reprocessing



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Balanced NFC – Rosatom new proposal in the sphere of NFC final stage



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The Customer Priorities:

Avoid geological disposal of SNF/HLW in the country of NPP location and associated costs

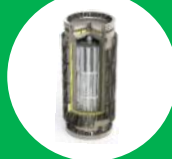
Reduce the amount of SNF/HLW, measured in the number of packages for long term storage

- Reduce «fresh» fuel costs by using regenerated uranium and plutonium
- Ensure public acceptance of nuclear energy in the country



SNF reprocessing with HLW fractioning

Basic proposal for all customers operating or constructing NPP with VVER reactors and LWR in the future



Effective «packaging»

Focus on the use of a unified SNF and HLW management infrastructure



Fuel fabrication from Regenerated nuclear materials
MA afterburning in fast neutrons reactors

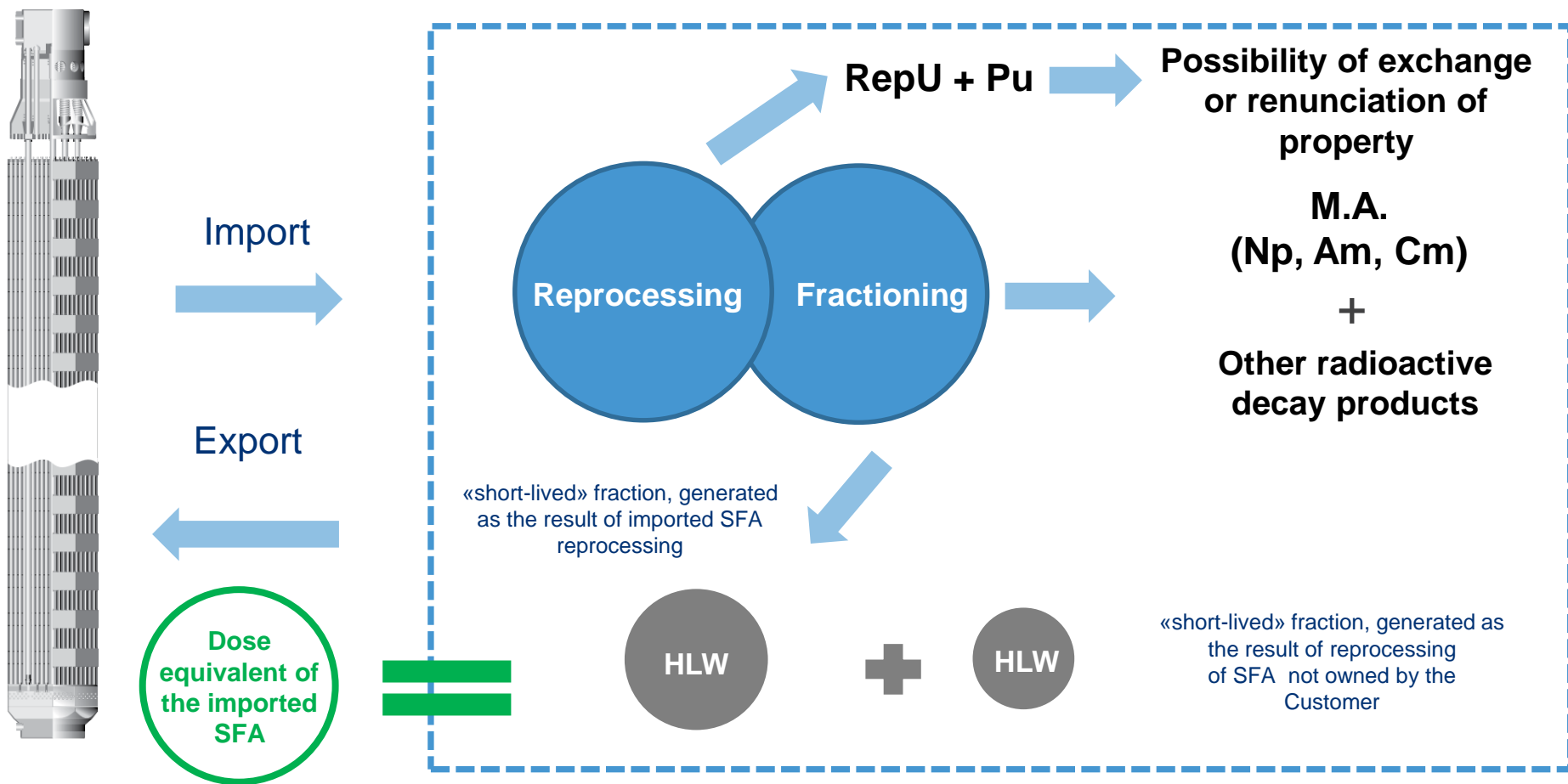
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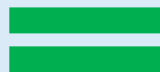
FUEL COMPANY OF ROSATOM

TVEL

SNF reprocessing with HLW fractioning and the return of Cs-Sr fraction on the principle of activity equivalent to Customer's State

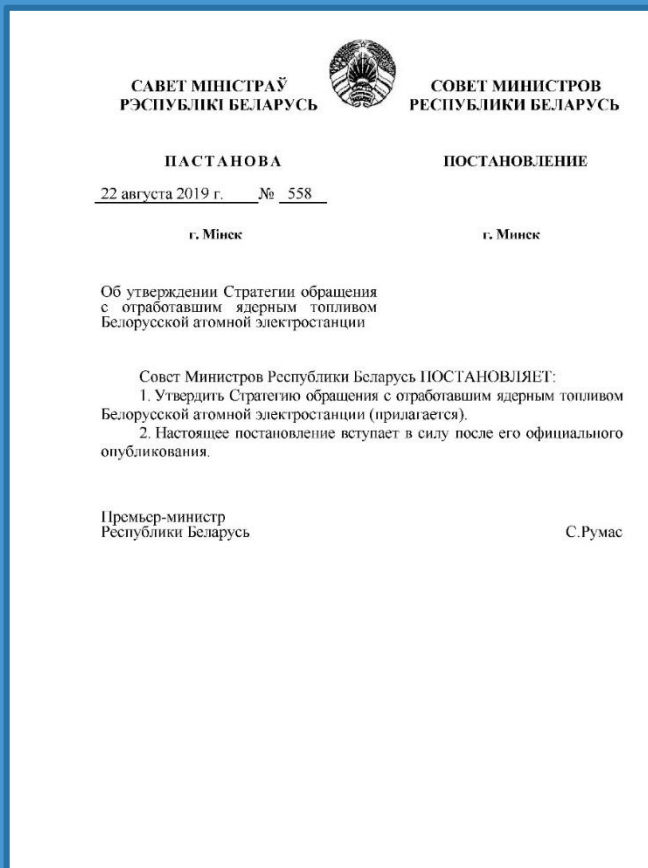


Dose equivalent of SFA imported to the RF*



Dose equivalent of products of reprocessing to be returned from the RF**

Principle of activity equivalent



Resolution No. 558 of the Council of Ministers of the Republic of Belarus dated 22.08.2019 approved the national strategy for the Belarusian NPP SNF management.

EXPERTS OF TENEX JSC CARRIED OUT THE FEASIBILITY STUDY OF THE BELARUSIAN NPP SNF MANAGEMENT

in order to assess the possible options for SNF management and the subsequent selection and justification of the strategy for the Belarusian NPP SNF and HLW management.

The strategic direction in the field of SNF management is SNF reprocessing in the Russian Federation **with the return to the Republic of Belarus of waste containing radionuclides of cesium-strontium fraction.**

The return of products of reprocessing to the Republic of Belarus will be carried out **on the basis of the principle of radiation equivalent** of imported SNF and products to be returned calculated according to the methodology agreed by the parties.



**SNF reprocessing:
Estimate results**

Two reprocessing approaches – low cost solutions



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NPP

2 units
VVER-1200

OPERATION PERIOD

60 years

 $\frac{\sim 5\,300 \text{ SFA}}{\sim 2\,850 \text{ t. d.U}}$

Traditional SNF reprocessing

HLW for disposal in deep geological repository

1,86 \$ per MW*h

New option

Cs-Sr fraction for cooling and near surface disposal

1,9 \$ per MW*h

SNF REPROCESSING AT ROSATOM ENTERPRISES ALLOWS THE CUSTOMER

Abandon the construction of infrastructure for SNF management on its territory

1

Demonstrate to the public the rejection of deferred decisions in the field of SNF management without significant increase in costs

2

Reduce the cost of SNF/HLW management by introducing elements of proposal for balanced NFC

3



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THANK YOU!