Russian Nuclear Legacy Programs and Results of International Cooperation in Russia in 2011-2012

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Areas of cooperation on nuclear legacy problems elimination in 2002 - 2012

- Decommissioning and environmental remediation
- Physical Protection
- RTGs decommissioning
- MA&C
- RRR SNF return
- Social programs
- Construction of replacement capacities

Providing implementation of 6 intergovernmental and 7 interdepartmental international agreements

Federal Target Program “Industrial Dismantling of Nuclear Submarines…”

Federal Target Program “Nuclear and Radiation Safety Assurance”
Results of nuclear legacy liquidation in 2012

- Installation of biological shielding at DSU 3A at Andreeva Bay in Murmansk Region
- Commissioning of two SRW shelters at Andreeva Bay in Murmansk Region
- FTB Lepse transportation from FSUE Atomflot to Nerpa Shipyard for further dismantlement
- Completion of works on installation of physical protection system at the site of V.G. Khlopin Radium Institute
Results of nuclear legacy liquidation in 2012

- Completion of removal of spent fuel from nuclear submarine PWRs from the settlement of Gremikha (Murmansk Region)

- Completion of the construction stage of cask accumulation pad at Andreeva Bay (Murmansk Region)

- Preparation for unloading of spent cores from LMC reactors

- Placement of the first three-compartment unit in the RC long-term storage facility “Ustrichny” for further cutting
Other achieved and expected results

- Spent core from nuclear submarine LMC reactor dismantled and unloaded
- Crane installation at Atomflot
- Construction of the shelter over containers completed at Andreeva Bay
- Modernization of cells for disassembling defective canisters at Mayak
- Completion of ionizing radiation sources removal from Murmansk Radon
- Another 7 reactor units placed in Saida for cleaning, painting and storage
- Reactor compartment units placed on a slipway plate in Saida
- Execution of construction works at Saida on schedule
- Expedition to the Arctic carried out
Main results of the Federal Target Program “NRS Assurance” in the field of SNF and RW management (2008-2012)

Reserve capacities for SNF storage have been constructed at FSUE Mining and Chemical Combine (MCC):
• The capacity of “wet” storage facility for SNF from VVER-1000 has increased.
• A start-up complex of “dry” storage facility for SNF from RBMK-1000 has been constructed.

Risks regarding main volume of accumulated waste at FSUE “PA “Mayak” have been eliminated:
• Techa reservoir cascade dam has been reinforced.
• Combined sewer system has been put into operation.
• Upgrading is underway (cementation facility, vitrification furnaces).

180 large facilities have been prepared for decommissioning, 363 small facilities have been liquidated, inventory of 120 facilities has been carried out.

SNF removal to long-term storage centers.

Pilot demonstration facilities for SNF and RW management and D&D are being created.
Prolongation of the Global Partnership Program

At the G8 summit in Deauville (France, May 2011) it was decided to extend the mandate of the Global Partnership beyond 2012, expanding its geography and scope, including:

1. Management of decommissioned nuclear submarine spent nuclear fuel (SNF), including damaged fuel and reactor cores, until a safe end point;
2. Lifting of sunken nuclear submarines and reactor compartments containing SNF;
3. Lifting and dismantling sunken hazardous radiological objects;
4. Dismantlement of nuclear powered surface ships;
5. Recovery and disposal of radioisotopic thermal generators (RTG) and other highly radioactive materials and radiological sources.

It is proposed to spread the experience of the Global Partnership to address the problems not only of the Navy legacy but also of the legacy of other hazardous facilities with the view of further use of the achieved results at sites outside Russia.
Institutional model and regulatory basis are actively being developed

- Federal Law “On Radioactive Waste Management” has been adopted.
- Departmental program of the development of infrastructure and SNF management in 2012-2020 and for the period up to 2030 has been approved.
- Federal laws on SNF management and decommissioning as well as the mechanisms of financial and economic interaction between the entities in the back-end of nuclear fuel cycle are under development.
- Federal Target Programs are funded.

Large quantities of accumulated SNF and RW

- about 22 thousand tons of SNF.
- about 570 million cubic meters of RW.
- more than 1 000 nuclear and radiation hazardous facilities are in operation or have been shut down as well as tens of thousands of radiation sources.

SNF and RW management infrastructure is necessary

- The existing SNF management infrastructure cannot provide the centralized storage and reprocessing solution.
- RW management infrastructure does not meet the new challenges.
Accumulation of resources of the world community and the Russian Federation to provide nuclear and radiation safety on the planetary scale

The Global Partnership – a tool of resource consolidation

State programs in RF

Provision of nuclear legacy liquidation in RF

1. The achieved progress became possible through international cooperation, Donors’ interaction and coordination between them.

2. Vast experience in the field of D&D, SNF and RW management has been accumulated.

3. Environmental situation has been improved on the planetary scale.

G8 Declaration – support at the level of leaders of the states

24 States Parties

Top-down
SC “Rosatom” is a guarantor of targeted use and FTP ordering party

Bottom-up
SC “Rosatom” provides the implementation of intergovernmental agreements and execution of interdepartmental agreements
Areas of cooperation on nuclear legacy challenges liquidation in 2012 - 2022

- Decommissioning of nuclear submarines and icebreakers, and sunken nuclear and radiation hazardous objects
- Physical protection
- Decommissioning of RTGs and ionizing radiation sources
- MA&C
- SNF management
- Social programs
- RW management
- Providing implementation of 6 intergovernmental and 7 interdepartmental international agreements

Federal Target Program “Industrial Dismantling of Nuclear Submarines…”

Federal Target Program “Nuclear and Radiation Safety Assurance”
Expected outcomes in the area of dismantling of nuclear submarines and icebreakers and lifting of sunken objects

1. Construction of SNF and RW management facilities at Andreeva Bay and regional centers in the North-West and Far East of Russia
2. Construction of facilities to provide SNF removal and its reprocessing at Mayak
3. Formation of one-compartment reactor units and their placement for long-term on-shore storage
4. Construction of a pontoon for reactor compartment transportation
5. Development of spent core disassembling technologies, spent core disassembling and reprocessing
6. Dismantling of surface vessels and ice-breakers, including FTB “Lepse”
7. Project development, lifting and dismantling of sunken objects

2012
Expected outcomes in the area of dismantling of RTGs and ionizing radiation sources (IRS)

1. RTGs removal from the Antarctic
2. RTGs transportation to the places of disassembling
3. RTGs disassembling and further placement for storage
4. IRS inventory
5. Construction of facilities for IRS transportation and long-term storage
6. IRS transportation to long-term storage sites
7. Decommissioning of IRS storage facilities

2012
Expected outcomes in the area of SNF management

1. Russian research reactor spent fuel return
2. Design and manufacture of SNF transportation facilities
3. Removal of SNF from NPPs
4. Centralized storage of SNF of different types
5. Other projects of mutual interest as agreed

2012
### Expected outcomes in the area of RW management

1. **Construction of RW isolation and long-term storage facilities**

2. **Creation of an international pilot demonstration center**

3. **Development of effective reprocessing and storage technologies**

4. **Design and manufacture of transportation facilities**

5. **Projects resulting in significant reduction in RW volume (equipment decontamination, smelting, pressing etc.)**

6. **Other projects of mutual interest as agreed**

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**2012**
Expected outcomes in the area of decommissioning

1. Decommissioning of facilities in large cities
2. Development of integrated projects for NPP decommissioning
3. Decommissioning of complex facilities
4. Performance benchmarks for decommissioning
5. Other projects of mutual interest as agreed

2012
Expected outcomes in the area of social programs

1. Emergency preparedness
2. Emergency notification
3. Employment of personnel after decommissioning of nuclear and radiation hazardous facilities
4. Cooperation with NGOs
5. Interaction between supervisory authorities
6. Other projects of mutual interest as agreed
Target results of the future strategy of the nuclear fuel cycle back-end

**Disposition of SNF, RW, D&D legacy**

- legacy SNF – disposition of all volume of legacy SNF by 2070;
- D&D legacy – bringing or carrying out works to bring all nuclear and radiation hazardous facilities to a safe final state by 2070, except those in operation;
- legacy RW – disposition of all volume of legacy RW by 2070.

**SNF and RW management infrastructure buildup**

- Development of SNF disposition infrastructure sufficient for disposition of all volume of legacy SNF and annually produced SNF. It is planned to build a Pilot Demonstration Center, RT-2 facility and centralized storage complex;
- Development of RW disposal infrastructure sufficient for the disposal of all removable legacy RW, and annually generated RW. It is planned to construct a federal geological disposal facility for HLW and long-lived ILW; not less than six regional near-surface disposal facilities for LLW and short-lived ILW.

**Buildup of the institutional model and regulatory framework with regard to international cooperation**

In the context of the slide, the term "disposition" means bringing an object to a predetermined target state
Thank you for your attention!

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