State atomic energy corporation “Rosatom”

Division of state policy on Radioactive Waste and Spent Nuclear Fuel management, Nuclear Decommissioning

Russian national RWM policy and strategy

Sergey Deryabin

Legnaro, Italy

2 - 4 May 2017
Development of RWM policy and strategy

The principal steps in the development of RWM policy and strategy (IAEA, № NW-G-1.1, 2009)

- **Government**
  - Formulate policy statement
  - International obligations (treaties, agreements, conventions)
  - National circumstances (energy policy, resources, waste inventory)

- **Ministries**
  - Implement policy
  - National legislative system
  - National RWM infrastructure
  - Funding system

- **RWM agency, RW generators**
  - Elaborate strategy
  - Technical Infrastructure
  - Technical options
  - Implement strategy

- **Russian National RWM policy and strategy**
  - **Federal Law:** “On RWM …”
  - Government Acts, Regulators documents
  - Investment and production programs of National operator
  - Local strategies of Generators
1.1. Federal Law changed the RWM concept

- The Unified State System of Radioactive Waste Management is established to organize and ensure safe and cost-efficient management of radioactive waste including its disposal (Article 10)

- Radioactive waste (hereinafter referred to as RW) ... are subject to obligatory disposal at RW disposal facilities (Article 12)

- RW generated after the entry into force of the Federal Law ...., are owned by the organization the activities of which resulted in RW generation (Article 9)

- RW generating organizations are responsible for ensuring safe management of RW until it is transferred to the national operator (Article 10). The national operator ensures safe management of radioactive waste accepted for disposal (Article 20)

- Financial provision of activities on radioactive waste management, including its disposal, is carried out at the expense of RW generating organizations (Article 10)

- The amount of payment is determined basing on the tariffs for RW disposal and the volume of RW brought into conformity with the eligibility criteria for the purpose of disposal (Article 20)
1.2. New concept of RWM activities - technological and organizational changes

1. After the entry of the ACT № 190-FZ into force RW management activities are considered in the context of a full technological cycle

Previously organizations-operators of nuclear and radiation hazardous facilities bore the costs only at the initial stages of management.

From the moment of the entry of the Act into force, organizations-operators of nuclear and radiation hazardous facilities will bear financial responsibility for all stages including disposal.

2. Organizational structure of USS RWM has been defined
1.3. New concept of RWM activities – financial scheme

The mechanism of financial support of RW disposal was determined

- **Regular RW generators**
  - ROSATOM’s Reserve Fund
    - Funding of National Operator activities
    - Payment for RW disposal under the tariff in advance
  - National Operator
    - RW
    - RW transfer to the National Operator
    - Payment for RW disposal under the tariff upon RW transfer to the National Operator
    - Non-regular RW generators
  - Reserve
    - Payment for RW disposal under the tariff according to the contract (upon RW transfer or in advance)

Accumulated RW, RW resulting from SNF management and decommissioning
1.4. New concept of RWM activities - Tariff model

- **Class 1**: Heat-emitting HLW
- **Class 2**: Long-lived HLW and ILW + spent SRS of categories 1 and 2
- **Class 3**: Short-lived ILW and LLW + spent SRS of category 3
- **Class 4**: LLW and VLLW + spent SRS of categories 4 and 5
- **Class 5**: Liquid ILW and LLW
- **Class 6**: LLW, generated during uranium ore mining and processing

Method of long-term options of regulation

- Tariff**

Method of economically justified costs + indexation method

- Tariff**
## Tariff * model (conventional)

<table>
<thead>
<tr>
<th>Cost item</th>
<th>State</th>
<th>Specialized organization</th>
<th>RW producer</th>
<th>Payment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction of facilities for FW preparation for final isolation</td>
<td></td>
<td>Funds the construction</td>
<td>Pays for depreciation as part of the payment for services for RW preparation for isolation</td>
<td>Upon the transfer of RW to a specialized organization</td>
</tr>
<tr>
<td>Services for RW preparation for final isolation</td>
<td></td>
<td></td>
<td>Pays for services for RW preparation for isolation</td>
<td>Upon the transfer of RW to a specialized organization</td>
</tr>
<tr>
<td>Construction of facilities of RW final isolation</td>
<td>Funds the construction</td>
<td></td>
<td>Pays for depreciation as part of the payment for isolation</td>
<td>Upon the transfer of RW for isolation</td>
</tr>
<tr>
<td>Final isolation services (including monitoring)</td>
<td></td>
<td></td>
<td>Pays for services for final isolation of RW</td>
<td>Upon the transfer of RW for isolation</td>
</tr>
</tbody>
</table>

**Regulation method** – economically justified cost method

**Justification of the method** – operation program of the national operator for a planning year, in which the capital cost component is insignificant

Tariff rates are set for the period of a year at least
**Tariff ** model (innovative)

<table>
<thead>
<tr>
<th>Cost item</th>
<th>State</th>
<th>Specialized organization</th>
<th>RW producer</th>
<th>Payment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction of facilities for FW preparation for final isolation</td>
<td>Funds the construction</td>
<td>Pays for depreciation as part of the payment for services for RW preparation for isolation</td>
<td>Upon the transfer of RW to a specialized organization</td>
<td></td>
</tr>
<tr>
<td>Services for RW preparation for final isolation</td>
<td></td>
<td>Pays for services for RW preparation for isolation</td>
<td>Upon the transfer of RW to a specialized organization</td>
<td></td>
</tr>
<tr>
<td>Construction of facilities of RW final isolation</td>
<td></td>
<td>Funds the construction</td>
<td>Upon the RW generation with the adjustment on RW transfer for isolation</td>
<td></td>
</tr>
<tr>
<td>Final isolation services (including monitoring)</td>
<td></td>
<td>Pays for services for final isolation of RW</td>
<td>Upon the RW generation with the adjustment on RW transfer for isolation</td>
<td></td>
</tr>
</tbody>
</table>

**Regulation method** – long-term regulation parameter method

**Justification of the method** – investment and operation program of the national operator, and the share of investment component is significant (for RW disposal the share of investment component in the tariff is more than 50%)

**Investment and operation components** are clearly separated

Tariff is calculated based on ROI period (for the period of 2012 - 2035)

Tariff rates are set for 5-year-period at least and are to be revised in particular cases
1.5. New concept of RWM activities – Example of dynamics of RW storage facilities filling under transition to waste disposal concept

- Without the commissioning of new capacities for RW processing the storage facilities will be completely filled by 2022.
- Factoring in commissioning of new capacities for RW processing and reduction of RW volume the storage facilities will be filled by 2037.
- Starting from 2019 the disposal volume will actually become equal to the volume of RW generation and processing at the enterprises of the branch ~ 7 thousand cubic meters.
- By 2025 the volume of filling RW storage facilities will reach the level of 2013 and evacuation of accumulated RW from storage facilities will begin.
2.1. Problem points – What are the effective RWM infrastructures?

- RW management is not a link in the value chain and not the final stage of another cycle, but it is a separate technological cycle. To be more precise, two types of technological cycles: RW management cycles and disposal facilities life cycles.

- RW management still is the only activity in Russia, for which the law establishes the principle of life-cycle management (taking into account all stages of management, including RW disposal).

- RW management cycles are the “longest” technological cycles, they have their roots in other technological cycle of nuclear power. Therefore they set the appearance and the time scale during the transition to the concept of industry lifecycle management.

- The activities on radioactive waste management are infrastructural. We should not hurry just to earn money from certain services for RW management and to achieve the efficiency of services. We must learn to create effective technological infrastructure for RW management. This is the key role of the centralized service.

- Technological infrastructures are efficient if operation for RW management is organized as service activity, which can render all the necessary service volume to operator organizations generating RW in all regions where these organizations operate.
What is “RWM activities”? 

- A cost item? 
- Potential standalone business? 
- A part of a value chain? 
- One of the branch's basic technological cycles? 
- A function of a state management? 
- An infrastructural system element of economics? 
- The answer depends on the problem being solved.

The answer depends on the management problem being solved.
## Different problems – different models

<table>
<thead>
<tr>
<th>RWM is:</th>
<th>Problem being solved:</th>
</tr>
</thead>
<tbody>
<tr>
<td>A cost item</td>
<td>• Cost planning</td>
</tr>
<tr>
<td></td>
<td>• Actual cost control</td>
</tr>
<tr>
<td></td>
<td>• Taxation calculation</td>
</tr>
<tr>
<td>Potential standalone business</td>
<td>• Pre-disposal RW services</td>
</tr>
<tr>
<td></td>
<td>• Accumulated RW problem solution</td>
</tr>
<tr>
<td>A part of a value chain</td>
<td>• Creation of competitive services and goods, essential for the nuclear sector</td>
</tr>
<tr>
<td>Creation of competitive services and goods, essential for the nuclear sector</td>
<td>• Implementation of a strategy of Russian nuclear sector technological development</td>
</tr>
<tr>
<td></td>
<td>• Creation of regional infrastructures of RWM on turnkey principles</td>
</tr>
<tr>
<td>A function of state management</td>
<td>• Creation of an organizational and normative basis, building of infrastructure objects</td>
</tr>
<tr>
<td>An infrastructural element of economics</td>
<td>Provisioning of a complex implementation of:</td>
</tr>
<tr>
<td></td>
<td>• state administration functions</td>
</tr>
<tr>
<td></td>
<td>• strategy of sector technological development</td>
</tr>
<tr>
<td></td>
<td>• creation of competitive services and goods</td>
</tr>
<tr>
<td></td>
<td>• legacy problem solution</td>
</tr>
</tbody>
</table>
2.3. Problem points – two circuits of the Russian modern governance system in the field of RWM

Good Governance principles:
- timely provision of all interested parties with sufficient information to make sound decisions
- conducting public dialogue with stakeholders
### 3.1. Implementing the values of cost effectiveness, safety and environmental compatibility: the Federal Law establishes 6 principles of USS RWM functioning

<table>
<thead>
<tr>
<th>Cost effectiveness</th>
<th>Safety and environmental compatibility</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Polluter pays for generated from revenues resulting from his operation</strong>&lt;br&gt;The law defines the source of funding</td>
<td><strong>The ultimate responsibility of the State for the safety of radioactive waste management is limited to the waste resulting from the use of technologies and products of the Russian origin</strong>&lt;br&gt;The law limits the ultimate responsibility of the State</td>
</tr>
<tr>
<td><strong>Polluter pays</strong>&lt;br&gt;The law determines who is responsible for financing</td>
<td><strong>The principle of prohibition of import or export of radioactive waste”</strong>&lt;br&gt;The law defines the source of funding</td>
</tr>
<tr>
<td><strong>Polluter is responsible for safety</strong>&lt;br&gt;The law determines who is responsible for safety</td>
<td><strong>The principle of availability for people and public associations of the information related to safety and prevention of accidents in RW management, as well as other information, if it does not contain information classified as state secret</strong>&lt;br&gt;<strong>Openness of information on safety</strong>&lt;br&gt;The law established the principle of openness</td>
</tr>
<tr>
<td><strong>The principle of taking into consideration the interdependence between RW generation stages and RW management stages</strong></td>
<td><strong>The principle of priority of protecting human life and health of present and future generations and the environment from negative impacts of radioactive waste</strong>&lt;br&gt;<strong>Radiation safety is top priority</strong>&lt;br&gt;The law determines priorities</td>
</tr>
<tr>
<td><strong>The principle of financial support of radioactive waste management activities from the funds of organizations generating radioactive waste”</strong></td>
<td><strong>The principle of availability for people and public associations of the information related to safety and prevention of accidents in RW management, as well as other information, if it does not contain information classified as state secret</strong>&lt;br&gt;<strong>Openness of information on safety</strong>&lt;br&gt;The law established the principle of openness</td>
</tr>
</tbody>
</table>
### 3.2. Implementing the values of cost effectiveness, safety and environmental compatibility: 6 principles of USS RWM governance were additionally introduced

<table>
<thead>
<tr>
<th>Principles of cost effectiveness</th>
<th>Principles of cost effectiveness</th>
<th>Principles of safety and environmental compatibility</th>
<th>Principles of safety and environmental compatibility</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reduction of RW generation volumes</strong> (reduction inclusive of safe RW management costs i.e. optimization of RW generation volume)</td>
<td>RW producer pays for generated RW from the revenues from operating activities</td>
<td>Ultimate responsibility of the State for safe RW management is limited to the waste resulting from the use of technologies and products of Russian origin</td>
<td>State responsibility for nuclear legacy as related to RW disposal should be reliably estimated (in the context of decision on classification of waste as “special”, i.e. cost optimization for RW disposal)</td>
</tr>
<tr>
<td><strong>“Pay and forget”</strong></td>
<td>RW producer pays</td>
<td>Availability and openness of information on radiation safety during RW management</td>
<td>Transparency of information on radiation safety</td>
</tr>
<tr>
<td><strong>Minimization of safe RW management costs</strong></td>
<td>Polluter is responsible for safe management</td>
<td>Radiation and environmental safety is top priority при размещении объектов инфраструктуры</td>
<td>Regionalization USS RWM (USS RWM is developed with due account of regional specifics)</td>
</tr>
</tbody>
</table>

**Micro economy (Organization)  
Macro economy (USS RWM)  
Integrated economy of the industry**
3.3. Providing cost-effective management of radioactive waste: Cost estimation of RWM as a built-in cycle

For the purposes of integrated estimation of RW management performance in USS RWM 8 interrelated financial and economic models are used:
- Models 1,2,3,4 allow evaluating RW management costs if technology cycles interface with nature cycles,
- Models 5,6,7,8 allow evaluating the cost of RW management if RW management technology cycles interface with main technological cycles (nuclear fuel cycle, NPP life-cycle etc.)

During 2011-2012, the concepts of all the eight models were developed and models 1,2,3 and 4 are prepared for implementation.

**New:**
- Norms for allocations to the reserves for RW disposal were approved, and organizations are to transfer the money to the fund,
- Organizations have planned the expenditures on radioactive waste management,
- Organizations record in current accounting under Russian Accounting Standards their liabilities for RW management,
- ROSATOM has started financing the activities of the National Operator in accordance with the tariff model.

**In 2013 a REFERENCE POINT was set in ensuring effective RW management**
Thank you for your attention!