INDICO #118

International Conference on the Safety of Radioactive Waste Management, Decommissioning, Environmental Protection and Remediation: Ensuring Safety and Enabling Sustainability
06-10 November 2023
Vienna, Austria

Track 5 – Practical experiences in integrating safety and sustainability

"Sustainable Development of the Unified State System of Radioactive Waste Management in Russian Federation"

By T. Rakitskaya (State Corporation "Rosatom"), Russian Federation

In 2011, the Russian Federation adopted Federal Act No. 190-FZ, which significantly changed the concept of RMW in the country. This Poster provides:

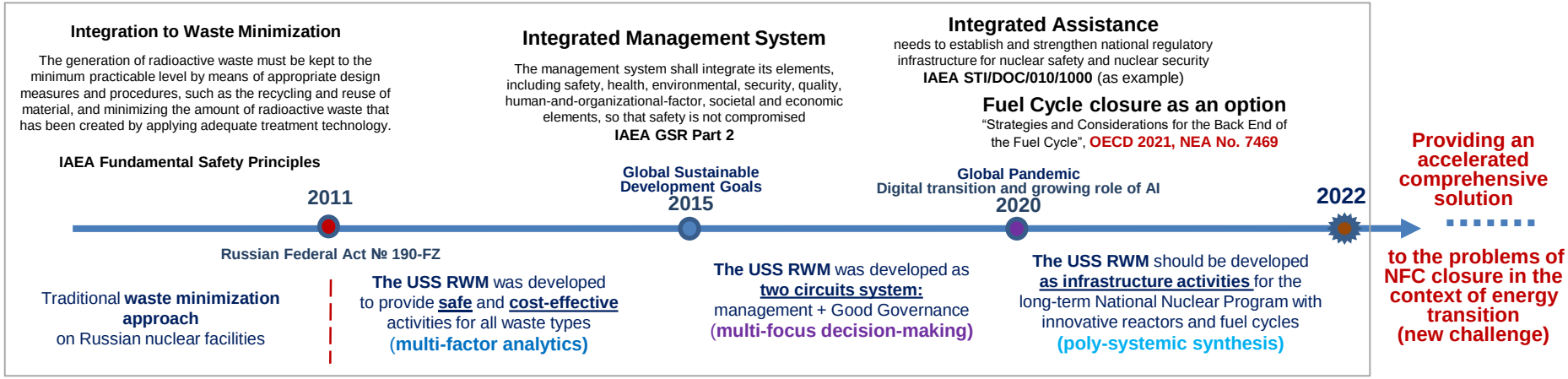
- **a description of the Unified State System of RWM in the Russian Federation and the 12-year history of its development in order to improve governability.**
- **complexity of the national RWM system in a country with a long history of the nuclear industry, accumulated problems and at the same time implementing a large-scale program for the construction of new facilities and the development of nuclear technologies; principles of organizing activities in accordance with the new Federal Act, which ensure the sustainability of RWM in the long term.**
- **the experience of integrating safety and sustainability in practice using novel approaches in communication and taking a lifecycle logic in management and governance.**

The development of Russian Unified State System of RWM (USS RWM) after 2011

In 2011 was adopted the Act No. 190-FZ, which collected the best practices in the regulation and creation of National RWM systems, and three innovative management concepts have been consistently mastered in Russia for 10 years, increasing the complexity of RWM in response to emerging challenges (see the diagram below).

But in 2021-2022, in connection with the OECD NEA report "Strategies and Considerations for the Back End of the Fuel Cycle" (NEA No. 7469) and the Delegated Climate Act within the EU Taxonomy, the RWM cannot be considered as a separate system of activity, but should be considered in the logic of managing the totality of the nuclear energy life cycles (including closed NFC), and, at the same time, in comparison with alternative energy sources. In fact, after 2021 Nuclear energy is focused on the integration of Multidimensional Safety (synergy of technologies for solving problems based on knowledge) and Long-term Sustainability (dynamic balance of interests of current and future generations).

Conclusion 1. For Nuclear Industry it is necessary to create a model of the totality of technological cycles, which requires a **Nonlinear Economy** that takes into account nonlinear connections between different technological cycles. **Circular Economy** is the fist step in this direction towards Nonlinear Economy.



* International Conference on Radioactive Waste Management: Solutions for a Sustainable Future, IAEA, 01-05.11.2021

The experience of integrating safety and sustainability in the intergenerational perspective (novel approaches in practice)

The scale of Nuclear Energy Program (NEP) is determined by the capabilities of existing infrastructures, namely: RWM infrastructure.*
The RWM infrastructure is basic, since the life cycles of waste disposal facilities are the longest cycles in Nuclear Industry (300 and more years).

We aware of the interests and responsibilities of current generations in the field of RWM by:

- ensuring a balance of current interests at the expense of **multi-factor reporting** and **multi-focus control system;**
- reliable assessment of financial obligations for disposal of RW and accumulation of funds on their execution;
- closing technological cycles and assessing the contribution of innovations to reducing financial liabilities in RWM;
- construction of waste repositories and RWM infrastructure;
- **solving the accumulated problems ("the needs and aspirations of the present generation are met without compromising the ability of future generations to meet their needs and aspirations").**

The interests of future generations are not available to us today, but we can develop our knowledge:

- based on the announced Global Sustainable Development Goals;
- developing National NEP as an element of "Clean" energy;
- **solving problems in the field of RW, SNF and Decommissioning as they arise today (we do not accumulate problems for future generations, we make financial obligations feasible and manageable for new NPPs);**
- **developing digital twins of NPPs and other facilities and modeling future streams of waste, obligations, values and knowledge, using artificial intelligence.**

We need to ensure effective monitoring the balance of interests of current and future generations in RWM area in the course of NEPs elaboration and implementation.

* International Conference on Radioactive Waste Management: Solutions for a Sustainable Future, IAEA, 01-05.11.2021

Promising directions of monitoring the dynamic balance of interests of current and future generations of professionals:

1. **The development of a Global Ontology of the usage of Nuclear and Radiation Technologies in the context of Sustainable Development within the framework of international cooperation under the auspices of the IAEA.**
2. **The Implementation of several pilot projects with the participation of experienced experts and a new generation of specialists (solving current Back-end problems at national level and applying digital models) to develop Applied ontologies in the areas of SNF and RW management, decommissioning and remediation of nuclear legacy facilities.**
3. **Updating the IAEA GNSSN - creating a digital platform and forming promising prototypes of regional digital security ecosystems within the framework of Global Ontology.**

Conclusion 2. Suggested priority steps:

- start pilot projects based on bilateral cooperation between a nuclear and radiation technology vendor and a new-comer country (using Russian experience in the development of Applied ontologies for the updating digital ecosystem of GNSSN);
- initiate the development of a **Global Ontology** within the framework of the project «Status and Trends in RW and SNF Management»).