ON STRUCTURAL ADVANCEMENTS IN THE PRESENTATION OF DATA UNDER THE NATIONAL REPORT OF RUSSIA ON THE JOINT CONVENTION

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The article proposes some improvements associated with the presentation of information under the National Report of the Russian Federation on the fulfillment of obligations arising from the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.

Keywords: *Joint Convention, safety, radioactive waste, spent nuclear fuel, inventories, meeting of the Contracting Parties, National Report.*

The Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (hereinafter referred to as the Joint Convention) [1] is a most distinguished forum for the international exchange of experience in the field of atomic energy use. Participation in the Joint Convention primarily requires the Contracting Parties to fulfill certain obligations, such as regular submission of national reports, their written discussion in absentia and in person at meetings. It also provides opportunities to demonstrate the implementation level as regards the obligations and national achievements in spent nuclear fuel (hereinafter, SNF) and radioactive waste (hereinafter, RW) management, as well as to learn about the best practices of other countries in these areas.

The Joint Convention was ratified by the Russian Federation in 2005. Since then, six national reports have been presented by Russia at the meetings of the Contracting Parties consistently informing the global professional community about the activities implemented to fulfill the obligations associated with the safe SNF and RW management [2—4].

The key milestones during this period can be summarized as follows: construction of a dry storage facility complex with a capacity of over 30,000 tons of SNF at FSUE MCC site; implementation of comprehensive infrastructure measures to address the challenge of overfilled SNF pools at nuclear power plants (hereinafter referred to as NPP) with RBMK reactor units, transportation of highly enriched Russian-design SNF from foreign research reactors for reprocessing to Russia, development of a new innovative SNF reprocessing plant at the FSUE MCC, adoption of a legal regulation on the mandatory disposal of radioactive waste, disposal of Class 3 and 4 RW, isolation efforts performed at a number of surface RW storage reservoirs at FSUE PA Mayak, JSC SCC, construction of an underground research laboratory (hereinafter, URL) started in the Nizhnekansk rock mass (Krasnoyarsk Territory).

Information provided about these milestones in terms of the progress and the results achieved both in the national reports and in their presentation at the Meetings of the Contracting Parties ignites the interest streaming a growing number of questions posed by different countries.

Close attention is paid to the national reports of the Russian Federation, which is demonstrated by its leadership in the number of questions. Most of them (Figure 1) are mainly focused on 15—20 topics.

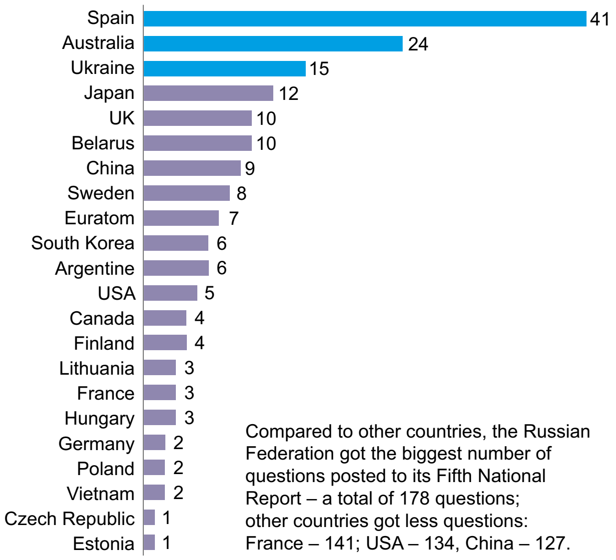


Figure 1. Number of questions on the national report of the Russian Federation posed by representatives of other countries in 2018

Questions posed to the five national reports of the Russian Federation were evaluated which allowed to identify the key areas of interest for other countries as regards the Russian practice. Figure 2 shows the areas the practical solutions in which are drawing constant attention.

The increased number of questions (Figure 3) may be explained by some activities launched in a number of areas (nuclear legacy cleanup, establishment of a specialized fund for RW disposal, URL construction). At the same time, their analysis shows that the well-established structure of the national report itself, on the one hand, reveals some ambiguities in the interpretation of data, and on the other hand, it neutralizes the effect of achievements in certain focus areas due to non-optimal data presentation.

As it comes to the data presentation under the national reports of Russia, it can be improved by shifting away from a general approach with more detailed information presented on RW storage facilities, which is provided for in the requirements to

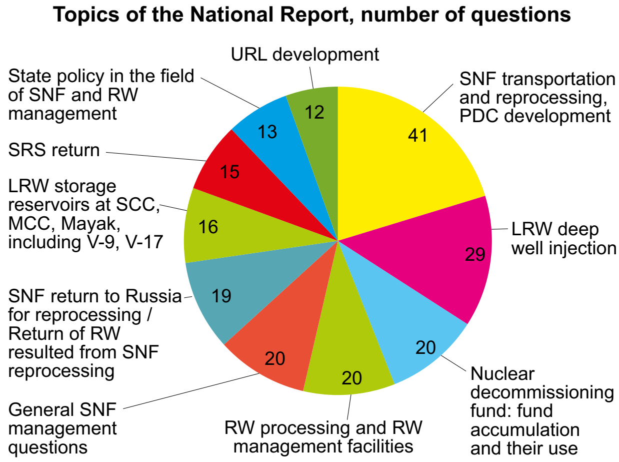
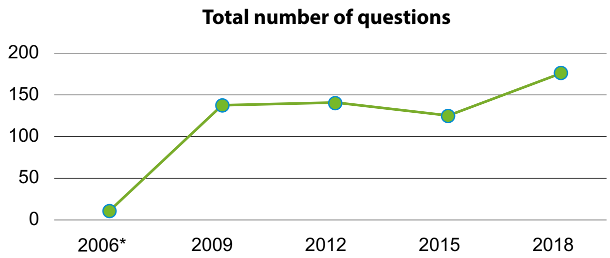


Figure 2. Most frequently asked and topical questions to the national report of the Russian Federation (the number of questions asked is indicated)



*Low number of questions was posed in 2006 since it was the first year when the Russian Federation acceded to the Joint Convention

Figure. 3. Total number of questions to the national reports of the Russian Federation

the inventory lists of the Joint Convention, which has been actively used for several years by a number of other countries.

During the development of the next national report, it's believed relevant to structure the RW Management section which could clearly demonstrate the progress at various stages of waste management.

This paper summarizes some proposals providing for some corrections in the concept of data presentation under national reports of the Russian Federation promoting clearer and more consistent data presentation and their perception. These proposals were developed based on the evaluated information provided both by organizations operating the enterprises of the State Corporation Rosatom and by the state safety regulatory authorities in the field of atomic energy use.

Requirements of the Joint Convention for the national report submission. Inventories and lists

Guidelines regarding the Form and Structure of National Reports [5] state that a significant amount of SNF and RW management data shall be presented in Section D Inventories and Lists, which reflects the fulfillment of the obligations of the Contracting Parties arising from paragraph 2 Article 32 of the Joint Convention [1].

The Contracting Parties are invited to include such categories as lists of SNF management facilities, SNF inventories, lists of nuclear installations, lists of RW management facilities under the inventory information submitted.

In particular, the requirement concerns the detailed composition of the RW inventory with RW that:

1) is stored in RW management facilities and nuclear fuel cycle facilities,

2) was disposed of or

3) resulted from practical activities implemented in the past.

This inventory contains the description of the material and other relevant information on its volume or mass, activity and specific radionuclides, which has been so far traditionally presented in the Russian national report in an integral form.

SNF in Russia is not considered as waste, and its management implies its further use as a raw material for the production of energy sources. Presented below are the suggestions on how to improve the content of the SNF management section.

Presentation of RW data in the national reports of Russia and other countries

The data presented in the national reports of the Contracting Parties on RW management varies in its form and especially in terms of the amount of information provided and its level of detail. In the national reports, each country provides the information that it considers most relevant. First of all, it concerns some specific aspects associated with the RW storage data.

In particular, the US national report [6] provides quite extensive data on all storage facilities, their ownership, locations, as well as on the volumes, isotopic composition and activity of the RW (see Tables 1, 2).

Table 1. Snippet of information on RW storage from the 7th US National Report [6]

Annex D-2A. Radioactive Waste Management Facilities: Government Facilities[271]										
State	Installation	Licensee	Regulator[272]	Facility	Function	Waste Source	Waste/Material Type	Inventory (m^3)[273]	Estimated activity (Bq)[274]	Rad Cat
California	Lawrence Berkeley National Laboratory	DOE	DOE/CA	Various Waste Facilities	Storage	2	LLW/MLLW	9.89E+02		6
	Lawrence Livermore National Laboratory	DOE	DOE/CA	Various Waste Facilities	Storage	1	LLW/MLLW	2.44E+03		1,2,3,4,5
						1	TRU/MTRU	3.33E+02	5.55E+14	3
	Stanford Linear Accelerator	DOE	DOE/CA	Various Waste Facilities	Storage	2	LLW/MLLW	2.06E+03		1

Table 2. Categories and key isotopes from the data on RW storage presented in the 7th US National Report [6]

Annex D-2 Key				
Waste Source		Radionuclide Category		
		Category		Key Isotopes
1	Defense applications	1	Activation Products	Primarily ^{36}Cl, ^{55}Fe, ^{54}Mn, ^{65}Zn, ^{68}Co, ^{60}Co, ^{63}Ni
2	Nuclear applications	2	Mixed Fission Products	Radioactive isotopes and daughters from ^{72}Zn to ^{158}Gd, primary longer-lived isotopes are: ^{85}Kr, ^{89}Sr, ^{90}Y-^{90}Sr, ^{91}Y, ^{95}Zr, ^{95}Nb, ^{103}Rh, ^{103}Ru, ^{106}Rh-^{106}Ru, ^{125}Te-^{125}Sb, ^{137}Ba-^{137}Cs, ^{141}Ce, ^{144}Pr-^{144}Ce, ^{147}Pm, m^{151}S, and ^{155}Eu
3	Commercial	3	Transuranic Isotopes	Isotopes of Cf, Bk, Cm, Am, Pu, Np, and their respective decay products
		4	Naturally-Occurring Isotopes	^{238}U, ^{235}U, ^{234}U, ^{232}Th, and their respective decay products (^{231}Pa, ^{227}Th, ^{228}Th, ^{230}Th, ^{231}Th, ^{234}Th, ^{227}Ac, ^{228}Ac, ^{223}Ra, ^{224}Ra, ^{225}Ra, ^{223}Fr, ^{219}Rn, ^{220}Rn, ^{222}Rn, ^{215}At, ^{218}At, ^{219}At, ^{210}Po, ^{211}Po, ^{212}Po, ^{214}Po, ^{215}Po, ^{216}Po, ^{218}Po, ^{210}Bi, ^{211}Bi, ^{212}Bi, ^{214}Bi, ^{210}Pb, ^{211}Pb, ^{212}Pb, ^{214}Pb, ^{206}Ti, ^{208}Ti, and ^{210}Ti) ^{14}C, ^{40}K, ^{40}V, ^{87}Rb, ^{115}In, ^{123}Te, ^{138}La, ^{142}Ce, ^{144}Nd, ^{147}Sm, ^{148}Sm, ^{152}Gd, ^{156}Dy, ^{176}Lu, ^{174}Hf, ^{180}Ta, ^{187}Re, ^{190}Pt, ^{204}Pb, ^{215}Bi
		5	Tritium	^{3}H
		6	Various	Radioactivity from various sources and categories

Table 3. Snippet of information on RW storage from the National Report of France [6]

BNI No.	Name and location of the facility	Licensee	Type of facility	Declare on:	Authorised on:	Official Journal (J.O.) date:	Observations
18	ULYSSE (Saclay) 91191 Gif-sur-Yvette Cedex	CEA	Reactor (undergoing decommissioning)	27.05.64			Final shutdown and decommissioning decree 2014-906 of 18.08.14 (J.O. of 21.08.14)
29	ARTIFICIAL RADIONUCLIDES PRODUCTION PLANT (Saclay) 91191 Gif-sur-Yvette Cedex	Cis Bio International	Manufacture or transformation of radioactive substances	27.05.64			One modification decree (change of licensee)
53	ENRICHED URANIUM AND PLUTONIUM STORAGE WAREHOUSE (Cadarache) 13115 Saint-Paul-lez-Durance	CEA	Holding of radioactive substance	08.01.68			Final shutdown declared by the CEA for 31 December 2017
63	FUEL ELEMENT FABRICATION PLANT 26104 Romans-sur-Isere	Framatome	Manufacture of radioactive substances	09.05.67			Change of licensee: decree of 02.03.78 (J.O. of 10.03.78), decree

At the same time, the data format in the National Report of France [6] does not contain such details and is limited to integrated data presentation (see Table 3).

Supported by IAEA, a number of countries, in particular, those being members of the Nuclear Energy Agency/Organization for Economic Cooperation and Development (NEA/OECD), the European Commission, launched a joint initiative On the Need for Coordinated Presentation of SNF and RW Inventories. Within its framework, in 2014 under NEA auspices, an ad hoc group on waste inventory and the development of a common reporting methodology (EGIRM) was established. Under this proposal, a group of OECD experts was tasked to review the RW and SNF management strategies of NEA member countries to establish a common presentation framework for the national inventories. These efforts resulted in a data presentation flowchart and a methodology, which covered all the strategies of the NEA member countries with an emphasis placed on the management of SNF and RW resulted from the reprocessing [7]. Under EGIRM, uniform units of measure, forms and designations were used providing the highest possible level of comparability for the data from the national inventories.

EGRIM has successfully worked out a single format combining different options used to present SNF and RW inventories: it's a diagram being directly related to the disposal strategy for each SNF and RW type. To facilitate its use, a specific methodology has been developed as an auxiliary tool supporting international programs for the collection and aggregation of national inventories. Since the methodology is based on the technical aspects of SNF and RW management, it enables consistent data presentation.

The methodology has been tested by members of the OECD Expert Group and individual NEA volunteer countries based on their own inventories. This testing has demonstrated high performance of this methodology under a wide range of programs, strategies and classification systems. In the future, it is planned to expand it to all types of SNF and RW, as well as relevant management strategies.

In terms of RW management, the national reports of the Russian Federation on the Joint Convention basically follow the tradition laid down in the first national report and mainly focused on the provision of integrated data. Primary this can be explained by the fact that during its development, reliable and adequately validated data were not fully available under the State Accounting System for Radioactive Substances and Radioactive Waste (hereinafter referred to as SGUK RV and RAO). Although the primary RW registration campaign of 2013—2014 provided a vast and largely validated data base, the data presentation format used in the national report hasn't been by and large updated, while the SGUK RV and RAO database could provide detailed information about the RW held in storage facilities and their sites as soon as the primary registration acts were filled in.

In-depth analysis of this information, on the one hand, corresponds to the goals stated under the development of the Unified State System for RW Management (hereinafter referred to as USS RW) and is considered as a must to solve the practical challenges. Based on reliable data one can draw plans regarding the construction of RW disposal facilities both in terms of RW volumes and waste compliance with the acceptance criteria for disposal.

On the other hand, consistent loading of the processed data serves the stated purposes and in terms of international cooperation directly corresponds to the recommendations of the Joint Convention regarding the openness and the transparency of information on RW volumes, activity levels and specific radionuclides.

The above arguments are seen a just cause demonstrating that relevant sections of the national report should be supplemented, mainly the Inventories and Lists subsection (for some facilities) by differentiated data on the RW stored in Russia.

Updating the goals and priorities in the structured data presentation under the RW management section

As mentioned before, national safety priorities and nationally specific features associated with the staged implementation of relevant goals should be singled out from the entire range of generalized tasks relevant for the data presentation under the report.

Specific aspects associated with the safe RW management in the Russian Federation are primarily explained by the historical background. This historical background was driving the need for addressing previously deferred tasks of the past period, namely, nuclear legacy cleanup, in particular [8—11]:

- significant volumes and activity of accumulated RW, including high-level waste held in storage tanks;
- surface LRW storage reservoirs, including V-17 and the Techa cascade of water reservoirs (hereinafter referred to as TCR) considered a potential threat for the environmental safety in these areas;
- large nuclear and radiation hazardous facilities that were shut down but not decommissioned (hereinafter referred to as NRHF), including production uranium-graphite reactors (hereinafter referred to as PUGR);
- contamination of adjacent territories, surface and underground waters.

During the initial registration campaign of 2013—2014, a category of special (non-removable) RW has been specified [12, 13]. Unlike removable RW, the risks associated with radiation exposure, other risks, as well as the costs associated with the removal of such RW from repositories and its subsequent handling, including disposal, exceed the risks and costs associated with the in-situ disposal of such RW.

The disposal facilities for non-removable RW differ in terms of safety barrier characteristics and the waste stored in them.

Non-removable radioactive waste

Surface LRW storage reservoirs

Surface LRW storage reservoirs are characterized with extremely high potential hazard levels compared to other nuclear legacy facilities of the USSR period available in the Russian Federation.

17 reservoirs, including V-17 (FSUE PA Mayak), B-25 (JSC SCC), account for the largest waste inventory (in terms of volumes and activity levels of the accumulated liquid radioactive waste (LRW)). Currently, the situation is gradually improving, a number of reservoirs has been backfilled, including V-9 — Lake Karachay (FSUE PA Mayak), B-1, B-2, B-25 (JSC SCC).

Given the pace achieved in the implementation of relevant efforts, one can expect that the decisions made and the implemented measures prove to be successful and the nuclear legacy challenge will be resolved. Nevertheless, the impression from the data presented in the National Reports of the Russian Federation on the implementation of these large-scale efforts remains quite unclear since relevant data fragments stick in a large number of sections. Therefore, we believe that the key points should be highlighted in a different manner and the data presentation format should be adjusted.

It should be noted that the data on the state of surface LRW storage reservoirs and their presentation does not fit into the formats considered convenient for demonstration. Data on the volumes, radionuclide composition and activity level of waste stored in these reservoirs do not characterize the actual state of affairs. The volumes of disposed RW depend on the weather conditions and are characterized by high uncertainties. Given these features, emphasis should be primarily placed on the measures implemented and not on the quantitative changes in relevant characteristics.

In this regard, it seems reasonable to specify a particular component under the RW Management section summarizing the results of the implemented measures: milestones achieved for specific water bodies partially supplemented with tabular data demonstrating the decrease in the risk levels. Tables 4 and 5 present a rough idea on how the main content of this subsection may look like.

Table 4. Backfilled reservoirs

Site	Reservoir	Operation	Volume, thousand m³	Activity*, PBq/mln Ci
FSUE PA Mayak	V-9	1951–2015	~400	4,440/120
JSC SCC	B-2	-	~130	740/20
	B-1	-	~110	1,110/30
	B-25	-	~4	0.92/0.024
FSUE MCC	354	-	~11	0.035/0.00095

*At the time of maximum accumulation.

Table 5. Measures taken to provide the safety of LRW storage reservoirs at FSUE PA Mayak

Year	SF name	Measures
2017	Reservoir V-9 at FSUE PA Mayak	Measures were implemented to maintain the safety of RW storage facility (reservoir No. 9) at FSUE PA Mayak site, involving: • monitoring of groundwater contamination levels; • monitoring of building 190 and its condition; • geodetic monitoring focused on the backfilled water area of reservoir V-9; • monitoring of air contamination levels; • maintaining the safety of the backfilled area, drainage upland canal and access roads to the storage facility V-9; • radiation monitoring at the storage facility V-9
2018		Safety of RW storage facility (reservoir V-9) at FSUE PA Mayak site was provided: • monitoring of groundwater contamination levels was implemented; • monitoring of building 190 and its condition was implemented; • geodetic monitoring focused on the backfilled water area of reservoir V-9 was implemented; • monitoring of air contamination levels was implemented; • safety of the backfilled area, drainage upland canal and access roads to the storage facility V-9 was maintained; • radiation monitoring at the storage facility V-9 was implemented
2019		Monitoring efforts were implemented at the Techa Cascade of Water Reservoirs and the hydraulic engineering structures (TCR and HES) at FSUE PA Mayak site, including the following measures: • maintenance and repair of hydraulic structures and their elements; • the sate of groundwater around surface reservoirs, LRW storage facilities was monitored; • air contamination levels in the area of surface reservoirs, LRW storage facilities were monitored; • radiation monitoring was implemented at the sites of surface LRW storage reservoirs, TCR and HES; • hydrological observations were performed to assess the spread of radioactive contamination in surface water flows within the TCR impact zone; • analytical, regulatory and methodological support for the implementation of the Strategic Master Plan Addressing the Challenges of the Techa Cascade of Water Reservoirs

Similar format seems to be quite expedient for the data presented on other water reservoirs (TCR, hydraulic engineering structures (HES)).

Solid radioactive waste

Over 82 % of accumulated solid RW (hereinafter referred to as SRW) by volume was referred to the category of non-removable RW: 81 % of this inventory account for the tailings of PJSC PIMCU, PJSC NCCP and JSC ChMP. This waste contains natural radionuclides and is categorized as very low-level waste [17]. The option of RW removal from existing tailings has never been considered before due to two main reasons: the large volume of the waste and since the safety of these facilities has been demonstrated during their operation.

In the National Report, the approach used to report data on the LRW storage reservoirs can be applied as well to present information on non-removable RW. Due to similar temporal dynamics of the parameters and ongoing activities implemented to provide safety, all this information can be presented in one subsection.

Disused sealed radionuclide sources of ionizing radiation

Recently, particular attention has been paid to the management of disused sealed sources, including the one paid globally at the highest level. Under the Resolution 73/66 of December 5, 2018 [14], the UN General Assembly “calls on Member States to support and endorse the efforts of the IAEA aimed at improving the safety and security of radioactive sources, in accordance with resolutions GC(62)/RES/6 and GC (62)/RES/7 of the General Conference, and strengthening the physical protection of radioactive sources”, and also “recognizes the value of sharing information on national approaches to the control of radioactive sources and takes note of the approval by the IAEA Board of Governors of a proposal regarding a formal process for periodic and voluntary exchange of information and experience and assessment of progress achieved by States in implementing the provisions of the code of conduct on the safety and security of radioactive sources.”

Issues related to the management of disused sealed sources draw particular attention at the 5th and 6th meetings of the Contracting Parties to the Joint Convention.

However, even though the level of attention paid to the management of these sources at the Review Meetings has increased significantly, these issues seem to be a bit overlooked at the pages of the Russian National Report.

Section J provides brief statistical integral data and links to some legal documents regulating the management of spent sealed radionuclide sources (SRS), including Federal Law No. 190-FZ, the provision of which allows the return of SSR produced in Russian Federation to Russia.

However, it seems clear that this brief information is evidently insufficient. In fact, there is no essential information, i.e., information on the predisposal management of SRS. To date, under the sections devoted to RW management (both section

J Disused Sealed Sources and section RW Disposal) significantly expanded should be the information component discussing this activity, including data on the generation of RW falling under this category, waste conditioning, transfer to specialized organizations for disposal or processing.

Removable RW. Dynamics of volume changes

The idea of progress achieved in the safe management of RW both regarding its qualitative and, from a certain point of view, quantitative levels taking into account relevant historical background, can evolve based on such parameters as:

1) reduction of accumulated removable RW volumes,

2) increased volume of conditioned (prepared for disposal) RW compared to the RW generation volumes,

3) increase in the amount of RW disposal.

Each national report of Russia consistently presents the information on RW volumes in a descriptive form, which is associated with no less than two drawbacks: the data is dispersed throughout the text providing no visual representation and no opportunities for the evaluation of relevant temporal dynamics since the data are mainly given for only one year. Therefore, it seems reasonable to supplement or replace the textual representation of information with a tabular one. To analyze the changes in RW volumes during its management, information on accumulated RW inventory, RW from uranium ore mining, current RW generation and processing rates, RW disposal rate should be provided separately, for example, as shown in Tables 6—9. These data were presented in the 4th, 5th and 6th National Reports of the Russian Federation under the Joint Convention [6] (a dash indicates the lack of information on some indicators). Therefore, in the 7th national report of the Russian Federation, it may be recommended to present these data in a way showing the dynamics for several consecutive years.

Table 6. Dynamics of SRW generation by volume at the enterprises of the State Corporation Rosatom, thousand cubic meters

Division/area of activity	2013	2016	2019
NPP	3	7.5	7.24
RW from SNF reprocessing	1.25	2.16	1.9
Enterprises of TVEL Fuel Company and other activities	19.9	10.3	20.8
...	...	...	...
Total	1,200	720	730

Table 7. SRW. Generation and processing at the enterprises of the State Corporation Rosatom, thousand cubic meters

Division / area of activity		2013	2016	2019
NPP	Generation	3	7.5	7.24
	Processing	–	–	–
Enterprises of the TVEL Fuel Company	Generation	–	6.9	7.34
	Processing	–	–	–
SRW from SNF reprocessing	Generation	–	2.16	1.9
	Processing	–	–	–
Totally in 3 divisions	Generation	–	–	–
	Processing	6.7	31.8	28.9

Table 8. LRW. Generation and processing at the enterprises of the State Corporation Rosatom, million cubic meters

Division / area of activity		2013	2016	2019
NPP	Generation	$3.5 \cdot 10^{-3}$	$3.1 \cdot 10^{-3}$	$4.0 \cdot 10^{-3}$
	Processing	–	–	–
SCC, MCC, Mayak	Generation	1.6	0.79	0.78
	Processing	–	–	–
Total	Generation	1.7	0.8	0.79
	Processing	0.4	0.27	0.12

Table 9. Pre-disposal management of RW at the enterprises of the State Corporation Rosatom, thousand cubic meters

Process	2013	2016	2019
Conditioning	–	6.67	2.36
Handed over to NO RAO for disposal	–	2.22	2.87

We believe that integral analytical information on the volumes of waste belonging to various categories (HLW, ILW, LLW, VLLW) provided by the SGUK RV and RAO should be included in a text form as it was done before, for example, in a way they were given in a modified form in the 6th National Report of the Russian Federation [6].

The text block devoted to the safe LRW disposal should be much more informative providing description of a work progress taking into account the recommendations of the IAEA peer review mission on the safety of LRW deep well injection [18].

SGUK RV and RAO (the concept of expanding the information presentation)

The SGUK RV and RAO system operating in Russia was established in 1997 mainly seeking to identify the amounts of RS and RW, provide their accounting and control, prevent their losses, unauthorized use and theft: in the early days it literally became an essential part of the statistical data collection system.

Subsequently, its information collection approaches, on the one hand, have been constantly improved, on the other hand, repeatedly changing guiding documents rendered difficult the analysis and comparison of data for different periods.

Recently, the SGUK RV and RAO has greatly evolved as it comes to relevant technical aspects (data processing in a multi-user mode, automated generation of analytical reports, integration with corporate information systems of the State Corporation Rosatom, etc.) [15]. At the same time, still some improvements are anticipated due to the growing needs of the nuclear industry.

In terms of expanded SGUK RV and RAO capabilities supporting the development of the national report, certain problems have been faced as well, including:

- lack of analytical capabilities as regards hard-to-explain leaping annal fluctuations in the total RW activity (in particular, high-level RW);
- insufficiently detailed information on the movement of disused sealed sources;
- long response time to inquiries (due to technical errors in the preliminary recording on RW management, insufficient automation of analytical capabilities associated with the interdependencies of RW management stages rendering impossible the forecasts regarding RW volumes and characteristics, etc.).

At the outset, some of the tasks can be addressed via object-oriented queries (indicating specific storage facilities, etc.), and later — via the development of standard reporting forms on the fulfillment of obligations arising from the Joint Convention.

Structuring the SNF management section

The SNF management section basically complies with the goals and objectives of the Joint Convention. Some additions can nevertheless improve the analytical capacities associated with the safe SNF management.

Firstly, this refers to the measures enabling the analysis of activities aimed to stop SNF accumulation, in particular:

- table B1.2 of the National Report providing data on SNF volumes should cover a 3-year time period (in accordance with the frequency of the Meetings), for example, as presented in Table 15;
- a table on SNF shipment from Russian NPPs and RRs should be provided;
- table on SNF reprocessing is recommended to be provided.

The final SNF management stage in Russia provides for SNF reprocessing at the radiochemical plant RT-1 operating at FSUE PA Mayak site and another plant being under construction at FSUE MCC site. Separate information and its summary do not give any idea on the safety of the final SNF management stage. It seems especially true as it comes to the technologies expected to be applied at the facility being under construction which will provide significant reduction in the amount of RW resulting from SNF reprocessing. Wider coverage of this information is consistent with the goals of the Joint Safety Convention.

In addition, the ongoing progress in the development of new types of fuel, nuclear reactors and reprocessing technologies in Russia expected to close the nuclear fuel cycle providing for natural safety serves the same purpose.

Extension of the section on nuclear decommissioning

Under the Fundamental Principles of the Joint Convention, in their national reports Contracting Parties are encouraged to provide information on nuclear decommissioning activities, the scale of which is rapidly growing all around the world. These are quite specific both as regards particular countries and each particular nuclear facility.

In the coming years, many nuclear facilities will be decommissioned in Russia including research complexes and installations, power units of nuclear power plants, PUGR, nuclear fuel cycle facilities, LRW storage reservoirs, storage facilities for nuclear materials, radioactive substances and radioactive waste, as well as nuclear icebreaker fleet facilities.

In the national reports of Russia, data on nuclear decommissioning are mainly presented in an integrated form involving a number of lists. At the same time, more detailed information on the decommissioning of some unique facilities seems to be quite helpful for other Contracting Parties and could support the implementation of relevant national projects.

It should be noted that in some national reports such information was provided. In particular, the 5th national report [6] provides detailed discussion of decommissioning activities performed at PUGR EI-2 at SCC site and Building B at VNIINM site.

It seems helpful to expand such information, which could also help to highlight Russia's best practices in this area. The following approach may be proposed as a “standard” one: provided are the lists of facilities being at decommissioning and pre-decommissioning stages with more detailed information on activities implemented at one of such facilities considered a most representative one in terms of indicators established for the best practices taking into account the prospects for their modification [16].

Conclusion

In conclusion, it can be noted that the conceptual proposals concerning an improved representation of information proposed in this article can serve a basis for the development of the next 7th National Report of Russia under the Joint Convention.

This may provide higher performance in addressing two main tasks: highlighting the progress in safety assurance and reflecting national priorities and national specifics within the scope of the Joint Convention.

The Russian Federation has ratified the Joint Convention and therefore fulfills its general obligations on taking appropriate legislative, regulatory and administrative steps to regulate the safety of SNF and RW management and ensure adequate protection of individuals, society and the environment from radiological risks and other hazards, as well as the compliance with the reporting and peer review mechanism, primarily by means of reporting under the national reports. At the same time, the Russian Federation strives for greater openness and clarity of the information presented in its reports. The article proposes some changes that could be introduced to the structure of data presented in the national report. These changes are aiming to provide most comprehensive idea of the activities showing the national specifics of efforts implemented in certain important areas associated with the safe SNF and RW management.

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