THE REPUBLIC OF MOLDOVA

THE THIRD NATIONAL REPORT UNDER THE JOINT CONVENTION ON THE SAFETY OF SPENT FUEL MANAGEMENT AND ON THE SAFETY OF RADIOACTIVE WASTE MANAGEMENT

National Agency for Regulation
of Nuclear and Radiological Activities

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SECTION A:

INTRODUCTION

After entering into the force of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (further - Convention) on 24 May 2010, the National Agency for Regulation of Nuclear and Radiological Activities (further - NARNRA) has submitted two National Reports - the first National Report was submitted in 2012 and the second in 2014 year.

The origin of radioactive waste in the country remains to be the use of radioactive sources in medical applications, research, education, industry and seized material from illicit trafficking of nuclear or radioactive substances and orphan radioactive sourses. All disused radioactive sources are stored in the Radioactive Waste Storage Facility "Special Facilities 5101, 5102" (further - "Special Facilities 5101, 5102") which serves for the whole country.

The national legislative and regulatory framework of nuclear and radiological activities (inclusive management of radioactive wastes) consists of the Law No. 132 of 8 June 2012 *on safe deployment of nuclear and radiological activities*, wich includes the section on national policy and priciples for radioactive waste management in base of IAEA safety standards, the Regulation *on radioactive waste management* approved by Government Decision No. 388 on 26 June 2009 and amended on 30 December 2013 by Government Decision No. 1079; the Regulation *on the safe transport of radioactive materials*, approved by Government Decision No. 434 of 16 July 2015 and the *2017-2026 National Strategy on radioactive waste*

management, *with Action Plan* recently approved by Law No. 68 on 13 April 2017 (See Annex).

SECTION B: POLICIES AND PRACTICES

Radioactive waste management policy

The Law No. 132 of 8 June 2012 *on safe deployment of nuclear and radiological activities* (further Law No. 132) , within the Article 41 of Section IX establishes the national policy and priciples for radioactive waste management.

The *2017-2026 National Strategy on radioactive waste management with Action Plan* for its implementation *(further - National Strategy)*, was recently approved by Parliament on 13 April 2017.

The National Strategy contains the approaches and technical solutions for the implementation of the Radioactive Waste Management Policy and main safety principles. It establishes the modalities and mechanisms for organizing of the measures that are to be undertaken in order to provide the responsible and safe management of radioactive waste.

Therewith, the *National Strategy* includes the commitments implementation way by the Republic of Moldova at the international level, based on the provisions of international treaties, those arising from the Convention and of the Law No. 132.

Radioactive waste management practices:

No updates

SECTION C: SCOPE OF APPLICATION

No updates

SECTION D: INVENTORIES AND LISTS

According to Regulatory Information System Database of NARNRA, currently are registered on the basis of declaration of the “Special Facilities 5101, 5102” the total count of 5900 spent sealed sources and nuclear material, (especial – depleted uranium), including:

- 21 sources of Category 2;
- 87 sources of Category 3;
- 227 sources of Category 4;
- over 5565 sources of Category 5 – (espetial smoke detectors with Pu-239 and Am-241);
- Nuclear material (DU) – over 2 000 kg;
- Cs-137 polluted soil – over 120 m^3

No sources of Category 1.

The categorization of the sources is based on the IAEA criteria (*in accordance with IAEA- Safety Guide-No. RS-G-1.9*).

SECTION E: LEGAL AND REGULATORY SYSTEM

From the second national report, there have been some changes to the legislation applied to the radioactive waste management.

In the light of the new Law No. 132 of 8 June 2012 o*n safe deployment of nuclear and radiological activities,* was approved:

- the new Regulation *on the safe transport of radioactive materials*, Government Decision No. 434 of 16 July 2015;

- the new Regulation *on physical protection of nuclear and radiological activities*, Government Decision No. 1268 of 23 November 2016;

- the *2017-2026 National Strategy on radioactive waste managemen with Action Plan*, recently approved by Parliament on 13 April 2017.

REGULATORY AUTHORITY

According to the Law No. 132 of 8 June 2012 *on safe deployment of nuclear and radiological activities,* (Article 10) the NARNRA is the single independent national authority with regulatory functions in the field of nuclear and radiological activities.

With introduction of the new sections in the mentioned Law, including the nuclear safeguards and the national policy and priciples for radioactive waste management, the structure of the Regulatory Authority was revised.

After approval of the new Regulation *on organization and functioning of the National Agency for Regulation of Nuclear and Radiological Activities, its structure and the staff limit,* Government

Decision No. 458 of 24 July 2015, was established the Radioactive Waste Management Service. For this purpose in structure of NARNRA has established one unit, which has in its functions the regulation of radioactive waste management in the country.

SECTION F: OTHER GENERAL SAFETY PROVISIONS

No updates

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SECTION H. SAFETY OF RADIOACTIVE WASTE MANAGEMENT

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SECTION I. TRANSBOUNDARY MOVEMENT

No updates

SECTION J. DISUSED SEALED SOURCES

No updates

SECTION K. PLANNED ACTIVITIES TO IMPROVE SAFETY

There main plan for the future is to implement the *2017-2026* National Strategy on radioactive waste management through activities aiming at identifying the paramount direction of the safer implementation of radiological and nuclear activities in the field of radioactive waste management (hereinafter - RAW). In addition, this Strategy sets out the methods and mechanisms for organizing the steps to be taken in order to provide responsible and safe RAW management.

Annex of

The Third National Report
Under The Joint Convention On
The Safety Of Spent Fuel Management
And On The Safety Of Radioactive
Waste Management

2017-2026 NATIONAL STRATEGY
on Radioactive Waste Management

Approved by Parliament

Law No. 68 of 13 April 2017

2017-2026 NATIONAL STRATEGY on Radioactive Waste Management

1. This Strategy on Radioactive Waste Management (hereinafter – the Strategy) is a document of activities aiming at identifying the paramount direction of the implementation of radiological and nuclear activities in the field of radioactive waste management (hereinafter - RAW). In addition, this Strategy sets out the methods and mechanisms for organizing the steps to be taken in order to provide responsible and safe RAW management.

In accordance with the international obligations undertaken by the Republic of Moldova as a member of the International Atomic Energy Agency (IAEA), the radioactive waste management policy is based on the following principles:

1) protection of human health: radioactive waste is managed so as to ensure an acceptable level of protection of human health;

2) environment protection: radioactive waste is managed so as to provide an acceptable level of environmental protection, including the natural resources;

3) protection beyond the borders of the Republic of Moldova: radioactive waste is managed so as to consider the possible effects on human health and the environment beyond the national borders;

4) protection of future generations: radioactive waste is managed so that the impact on health of future generations is not

to be greater than the relevant levels of impact that are acceptable today;

5) cut out the burden for future generations: radioactive waste is managed so as to cut out the undue burden on future generations;

6) national legal framework: radioactive waste is managed in an appropriate national legal framework, including the establishment of clear responsibilities and powers for the independent regulation of these activities;

7) control of radioactive waste generation: the generation of radioactive waste shall be kept at the minimum;

8) nuclear and radiological security, physical security of facilities with radioactive waste: nuclear and radiological security, physical protection of radioactive waste management facilities will be provided in an appropriate manner at each stage of the lifecycle of the plant.

9) provide information to the society: inform the public and make it participate to the decision-making process of implementing the action plan of this Strategy.

Safe management of the RAW generated in the Republic of Moldova is an important national political objective supporting the sustainable development of the national economy, environment protection, health, agriculture, research and national security as a whole. Therewith, the safe management of radioactive waste for all stages - from their generation to the final disposal - requires the presence of a national legal framework guaranteeing the fulfilment of commitments of the policies in the field, an effective regulation and a transparent apportionment of the responsibilities, as well as the development, provision of financial resources, and maintenance of scientific and technical capabilities, sufficient to ensure the successful implementation of this Strategy.

In addition to this, the particularly sensitive nature of the subject requires the provision of information to the public and ensuring its participation in the decision-making process and implementation of the action plan for carrying out this Strategy.

Delays in carrying out the National Strategy and the action plan that provides for the storage of radioactive waste would mean the unjustified transfer of the burden and responsibility to future generations.

2. The Strategy includes the method to implement the commitments assumed by the Republic of Moldova at the international level and is based on provisions of the international

treaties, arising from the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, ratified by Law No. 111 of December 18 2009 on the Republic of Moldova's Accession to the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (Official Journal of the Republic of Moldova, 2009, No. 197-200, Art. 652), from the Rio Declaration, from the 1997-2012 IAEA General Conferences Resolutions, from the provisions of Law No. 132 of June 8 2012 on the Safety of Nuclear and Radiological Activities (Official Journal of the Republic of Moldova, 2012, No. 229-233, Art. 739).

I. CURRENT SITUATION IN THE FIELD

3. The Republic of Moldova lacks a strategic framework that would set the directions for developing the radioactive waste management. Therefore, it is determined that the radioactive waste management is carried out without taking into account the radiological peculiarities of the radioactive waste, the type of emitted radiations and the period of halving the predominant radionuclides, while the methods of final storage (final disposal) of the radioactive waste with activities of large and medium radioactivity and with a half-life period of over 5 years are not formulated. Besides, the radioactive waste that is already stored in the underground storages adjacent to the ground surface at the "Special Items 5101 and 5102" Special Destination Enterprise (hereinafter - "Special Items"), which do not provide adequate radiological protection of the population and environment are not taken into account.

Another unresolved problem is that some waste contains radionuclides of the alpha type with a very long half-life period (of over thousands, millions and billions of years - Ra-226, Pu-238 and Pu-239, natural uranium, uranium with a different degree of enrichment uranium-235, Th-232 and a). The alpha type radionuclides are characterized by extreme radiotoxicity and stand as a very serious danger to the environment and to the health of the population. According to the international standards of radiological safety for the radioactive waste management, this type of radioactive waste needs to be isolated from the environment and stored permanently (finally disposed) in geological structures, thus, avoiding their accumulation at the storage points or temporary storage and prevention, their theft or accidental dispersion into the environment.

In addition to this, as a consequence of the fact that following the radiological accident in Chisinau that occurred on September 21 2015, 120 m^3 of soil contaminated with Cs-137 were formed, the problem of managing this low and medium radioactive waste remains to be a stringent one.

According to the opinion of the IAEA experts put forward in 2000, at the time of the inquiry, the situation at the "Special Items" is found to be critical and is classified as a radiological accident due to the fact that a part of the radionuclides in the underground storage migrated into the groundwater, so that it radioactively contaminated to a certain depth the soil of this radiological and nuclear object. Given the fact that this objective is in close proximity to Bubuieci village and is located in the area of Chisinau City, this situation cannot be accepted and tolerated now or in the future, with undertaking urgent measures to halt the migration of radionuclides from the underground storage, decommissioning, decontamination and remediation of the affected territory.

Delaying these actions will lead to the expansion of radioactive pollution of the soil and groundwater with all the adverse effects on the health of the population and socio-economic damage caused as a result of the radioactive contamination of the environment and the action of the ionizing radiations.

4. According to the statistics of the National Register of Ionizing Radiation Sources, managed by the National Agency for Regulation of Nuclear and Radiological Activities (hereinafter - NARNRA), in the Republic of Moldova, there are over 6,000 radioactive sources operated by about 200 economic agents (without the radioactive sources on the left bank of Nistru River) - potential radioactive waste generators. A large part of these sources contain radionuclides with a half-life of about 30 years, while others - over thousands and millions of years.

Given the number of operators who use radioactive sources in their activity, the amount of radioactive waste (estimated to be produced by operating these radiological facilities for the designed lifetime) comes from:

1) applications in the industry, medicine, agriculture, research – a total amount of about 5 m^3 per million inhabitants per year of radioactive waste with extra-low, low, medium and high activity;

2) used radioactive sources, situated at the radiological and nuclear objects – over 2,000 pieces;

3) used radioactive sources and historical radioactive waste from the "Special Items" in amounts exceeding 140 m^3;

4) radioactive waste arising from the remediation of some radiological or nuclear incidents or accidents (including the orphan radioactive sources) – it can be estimated at about 10% of the amount generated annually, so - 1.5 m^3.

5. At present, the following radioactive waste managers or generators are identified in the Republic of Moldova:

1) any economic entity, legal person, or holder of the radiological authorisation in the field of radioactive waste management (Nuclear Medicine Laboratories, Radiobiological and Radiochemical Laboratories);

2) holders of radiological authorization for the use of sealed or open radioactive sources;

3) "Special Items" Enterprise with special destination, holder of radiological authorizations for these areas.

6. The Republic of Moldova is part of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste, while the national regulations largely transpose the IAEA standards in the field of radioactive waste management. The recent passing of the Council Directive 2011/70/EURATOM of 19 July 2011 (*Official Journal of the European Union, 2.8.2011, L 199/48*) on establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste requires state-level approach to solving complex problems in safety management of the radioactive waste.

Thus, the main current shortcomings in the management of the radioactive waste are:

1) Lack of a technological concept to modernize the "Special Items" infrastructure, to recover, sort, treat and condition the historical radioactive waste, stored for about 50 years in inadequate conditions;

2) The uncertain and outdated status of the unique existing operator in storing, treating and conditioning the radioactive waste in the country;

3) Imperfection of the legislative framework concerning the creation of a Fund to support the radioactive waste management.

4) Insufficient qualified staff with special training in the field;

5) Insufficient funds on the part of the state to provide for the radioactive waste management and the lack of funds needed for the recovery and preservation of orphan radioactive sources, radioactive and nuclear materials from illicit trafficking;

6) Non-conformance of the underground storage conditions of the radioactive waste with the provisions of the legislation in force;

7) The lack of a national concept concerning the radiological monitoring program of the environment elements within the radiological objective and by the sanitary zone.

II. STRATEGY OBJECTIVES

7. The general objective of the Strategy is to reduce the impact caused by exposure to ionizing radiation on the population, derived from the current RAW management by stopping the process of radioactive contamination of the environment, by sorting and and reducing the amount of the radioactive waste and remedying the radioactively contaminated territories. Lowering the risk of over-irradiation of the population and excluding the radioactive contamination of the environment in the future and the burden on the future generations is a quantifiable objective of this Strategy (by preventing the overcome of the collective effective dose and by reducing it down to 0.01 mSv/year (millisieverts per year)).

8. This Strategy has the following objectives:

1) Implement the standards and procedures for safe management of the radioactive waste, which are used internationally by developing and implementing national normative acts in the field;

2) Provide for the radiological and nuclear security, including the physical one, for the radio-protection of the personnel that is occupationally exposed and for the population at present and in the future;

3) Develop the research programs related to the radioactive waste management up to final disposal and methods to reduce the impact on the health of the population and the environment, arising from the long-life radionuclides, the patterns for the migration of radionuclides in the environment;

4) Sustainable maintenance of the physical security of objectives that manage radioactive waste and physical protection of the high and medium activity radioactive waste, including during the transportation to storage, detection, identification and collection of the orphan radioactive sources;

5) Develop and maintain the human resources involved in activities with the radioactive waste, improve them within the entities that are operators with radioactive sources or the ones managing the radioactive waste;

6) Maintain the technical base associated with the process of radioactive waste management;

7) Ensure the funding of the radioactive waste management system according to the "Polluter pays" principle;

8) Keep the public informed about the radioactive waste management, by taking into consideration the sensitivity of the information on the physical security of the radiological objectives containing radioactive waste and other information protected by law, as well as ensure the public's participation to the decision-making process;

9) Manage the database (National Register of the Radioactive Waste) with information on the entire inventory of radioactive waste.

III. STRATEGY IMPLEMENTATION AND LINES OF ACTION

9. The Strategy shall be implemented by the authorized operators only for all stages of the radioactive waste management, from generation to long storage, including the final disposal.

10. The activities described in this Strategy will not be carried out for the radioactive waste, which, by their nature, contain only natural radioactive material, unless they are sealed radioactive sources or unless they are declared as radioactive waste by the authorized holders, according to Government Decision No. 388 of 26.06.2009 "on Approving the Regulation on Radioactive Waste Management."

11. The Strategy sets out the need for applying the radioactive waste management criterion that are internationally recommended through:

1) Characterizing their physical, chemical and radiological data;

2) Identifying the method for their treatment, conditioning, transportation conditions, processing, storage or final disposal.

Depending on the characteristics of the radioactive waste (caused by the activity and type of radionuclides) the following specific measures to protect the population and the environment against the dangers of radioactive contamination are proposed.

12. According to the basic principle of radioactive waste management, they have to be isolated, as efficiently as possible, from the population and the environment, as long as they represent a radiological hazard. Considering that the danger of radioactive materials radiologic diminishes over time due to radioactive decay, isolation will ensure a range of specially designed physical barriers. As for the radioactive waste with a long life, this barrier will be determined by the characteristics of the host rock (natural and/or engineering barriers).

13. The position according to which, regardless of the future of energy and non-energy applications of nuclear technologies to ensure long-term radiological safety, it is necessary to implement technologies for final disposal at the end of the management process of the existing and future radioactive waste, is internationally accepted. It is only the final disposal that guarantees by its passive safety characteristics the protection against all possible threats, which were mentioned above.

14. The intermediary storage of the radioactive waste represents an important step in the overall management of the radioactive waste, especially of those with high level activity, in order to reduce the radiation levels, thus, allowing their easier and more secure manipulation. However, the intermediate storage, including the long-term one, is only an interim solution requiring active and ongoing institutional control, a process resulted in considerable, inevitable and unjustifiable financial expenses, also involving some risks in terms of physical security and radiation safety in general.

IV. GENERAL REQUIREMENTS FOR RADIOACTIVE WASTE MANAGEMENT

15. Based on the legal provisions, the final responsibility for managing radioactive waste rests with the state, because the ethical principle, according to which the state (the society) should avoid imposing undue burdens on future generations, is recognized and applied.

16. In the context of carrying out the Strategy, it is very important that any holder of a radiation authorization – an operator with radioactive sources and a potential generator of radioactive waste - is responsible for:

1) Full responsibility for creating and managing the fund for radioactive waste generated by their own activity;

2) Bearing the costs of the collection, handling, transportation, treatment, conditioning and temporary and/or final storage disposal of the radioactive waste generated by their own activity;

3) Providing for and maintaining continuous inventory of the radioactive waste, contributing to the National Register in the field;

4) Ensuring transparent reporting of the information on the radioactive waste management, provided that they do not jeopardize other interests such as physical security, recognized by the national legislation or by the international obligations;

5) Conducting the necessary measures in case of the decision to deliver the radioactive waste to third party institutions specialized in the radioactive waste management.

17. In order to unify and quantify the radioactive waste management activities, the authorized radioactive waste management entities shall develop and implement their own Radioactive Waste Record (an electronic and/or a hardcopy one), as required by the legislation in force.

18. The Radioactive Waste Record will reflect the following radioactive waste data:

1) Brief description of the radiological activities that generate radioactive waste;

2) Quantity and characteristics of the radioactive waste (solid, liquid, gaseous);

3) Quantity and characteristics of the radioactive effluents released into the environment in an authorized way;

4) Brief description of the process of the radioactive waste treatment and conditioning;

5) Brief description of the packaging/containers and parcels with conditioned radioactive waste;

6) Brief description of the process of final disposal of the radioactive waste;

7) Inventory of the RAW at the interim storage, including their characteristics;

8) Inventory of the finally disposed radioactive waste, including their characteristics;

9) Results of the inspections, evaluations and check-ups conducted by the NARNRA on radioactive waste management activities;

10) Results of the assessments of nuclear and radiological safety and physical protection;

11) Results of monitoring and evaluation of the radiological impact on the environment;

12) Data on the radiological breakdown, accidents or incidents.

19. It should be taken into account that the way to manage the RAW is decisively determined by:

1) The level of ionising radiation discharged by the radioactive material;
2) The types of the radionuclides;
3) The life of radionuclides, determined by the half-life of the dominant radionuclides, shall be taken as a basis for designing the

goals for the storage, disposal or management of the radioactive waste.

Thus, the first factor determines the characteristics of the biological protection necessary to ensure the radiation safety of the operating personnel, of the population and the environment. The second factor determines the danger originated from the radioactive waste and sets out the degree of radiotoxicity or emanation of radioactive gases, while the third factor determines the time period required to isolate the waste from the population and environment.

20. It is proposed to use as barriers of isolation of the radioactive waste the systems made of such materials as: concrete, cast iron, steel, which also serve as biological protection. Also, according to the international experience, the natural barriers represented by the uniform rock layers, can be also used.

21. As for the safe isolation of the low and medium activity radioactive waste containing radionuclides with a half-life of less than 30 years (which reduce their radioactivity almost entirely, up to the exemption level, in several hundred years) from the people and the environment, it is mainly ensured through the engineering barriers. In case of highly active radioactive waste and/or long-life radionuclides, it is only the engineering barriers that are not able to provide reliable long-term isolation from the people and the environment, which is provided through a combination of the engineering and natural barriers.

22. To reach the goals, it is proposed to use the following management procedures, techniques and technologies that are verified and used on an international scale:

1) Characterize radioactive waste;
2) Sort the radioactive waste by type of radionuclide and the half-life period;
3) Treat the radioactive waste for the purpose of conditioning by considerably reducing the amount (evaporation, incineration, precipitation, vacuum drying, super-compaction etc.);
4) Condition the radioactive waste for their interim or permanent storage, by encapsulation in containers of cast iron or steel or placement in a matrix made of concrete or, if the case may be, made of bitumen or by other methods that are internationally accepted and approved by the NARNRA;
5) Control the quality in the process of treatment, conditioning and storage of the radioactive waste;
6) Decontaminate and dismantle the radiological or nuclear structures in case of their decommissioning;

7) Remedy the territory on which the radiological or nuclear facility was located;

8) Transport the radioactive waste by using the special transportation vehicles, capable of satisfying the requirements and provisions established under the national rules in the field, from the generators that are entities authorised to manage radioactive waste;

9) Intermediate storage in properly arranged warehouses;

10) Final disposal in definite deposits adjacent to the ground surface (10-30 m) or in deep geological deposits (over 100 m).

23. Taking into account the fact that in the Republic of Moldova, it is mainly the sealed radioactive sources that are used in the management of radioactive waste, it is proposed to apply the principle of sorting, treatment, conditioning and storing used radioactive waste by activity and type, according to Appendix 1.

24. As for the low and medium activity radioactive waste, the security of the management stages, including the final disposal, will be obtained by using the industrial technologies capable of providing the necessary economic efficiency with the implementation of the appropriate systems to ensure radiation safety and physical protection.

However, given the peculiarity of the radiological or nuclear radioactive waste, the final disposal installations adjacent to the surface or deep soil will be located, built and operated only under the NARNRA radiological authorization, issued as required by the legislation in force. The radiological authorization for the "radioactive waste management" type will be released only when the safety requirements, imposed to the used barrier systems, as well as by the quality management system used for the radioactive waste management, are met.

25. After finishing the final disposal activity, the following activities shall be mandatorily maintained: on-site institutional control, on-site radioactivity monitoring and on-site access prohibition to persons according to Government Decision No. 388 of 26 June 2009 on passing the Regulation on the Radioactive Waste Management.

26. The assessment of the radiation safety of RAW definitive stores is based on the detailed scientific analysis by calculating the radiological consequences of the long-term storage. The purpose of assessing the final disposal lies in quantifying the potential radiological risks, which may occur at any time after the closing of the store. The obtained results will be compared to the limits regulated by the legislation in the field to allow for the decision-

making on issuing permits for the store placement, construction and operation. The radiological safety assessments will be taken as a basis for identifying problems in this area. At the same time, to initiate such research, it is necessary to create or re-profile some departments or research-development laboratories in universities or academic institutions.

27. Taking into consideration the conditions specific for the Republic of Moldova, the radioactive waste management is proposed to be conducted through the technologies and techniques specified in section 22 of this Strategy and through:

1) storage - keeping the radioactive waste during their pre-treatment or treatment until the exemption level or keeping them in storage facilities until their final storage possibility as appropriate;

2) final storage that will be conducted through placing and storing the radioactive waste in a BOSS type store (Borehole Disposal of Sealed Radioactive Sources - definitive store for sealed radioactive sources) or other type of store for final disposal, without any of being recovered. This method of management will be used for radioactive waste with high activity with a half-life of over 5 years, radioactive waste with medium activity and half-life of over 30 years and radioactive waste with a long life (over 100 years) for medium and low activities.

V. ESTIMATE THE COSTS RELATED TO THE STRATEGY IMPLEMENTATION

28. The financial coverage of the expenses related to the radioactive waste management arising from orphan sources or illicit trafficking, as well as those historically originated, stored in "Special Items", according to the legislation in force, is made on the account of the radioactive waste generators, the State budget and other legal sources. Thus, it takes about MDL 59 million 800 thousand (Euro 2.9 mln.) for re-technologizing the "Special Items" infrastructure along with technologically providing for the process of historic radioactive waste management, as well as providing all the conditions for authorizing the radioactive waste management activity.

Is is also intended to use the international financial assistance granted under the technical cooperation projects of the IAEA, other international organizations and on the part of the states interested in strengthening the capacity of radioactive waste management in the Republic of Moldova.

29. The amount of funding for all phases will be established as a result of conducting the draft of the planned feasibility study.

Therefore, the Strategy proposes the use of a discrete approach to implementing the action plan by stages.

VI. STAGES OF STRATEGY IMPLEMENTATION

30. The list of the implementation stages of this Strategy and the expected results includes the following:

1) Draft and pass the legislative and regulatory framework (2017-2026) – the radiation safety standards for the radioactive waste management and guides on the systematization of information about the stored radioactive waste and technological processes of their management will be drafted during this phase. Specialized bodies (NARNRA, Ministry of Health and other relevant authorities) will take part to this phase;

2) Identify, determine the amount of funding to reach the Strategy goals as well as the informational-educational work with the civil society representatives (2017-2024) by putting forward the conclusions on the acceptance by the society of the managing manner and cost calculations to conduct the subsequent stages;

3) Draft the feasibility study on the use of the final disposal system (geological prospections, design the concept for the final storage points selection, construction, technical and technological equipment (2018-2021));

4) Obtain the solution with regard to the most relevant method of the final storage (final disposal) of the radioactive waste (2022-2023) by fulfilling the main goal of the Strategy - reduce the quantity of the RAW stored, effectively isolate the environmental radioactive waste and reduce the risk of contamination and overexposure for the population;

5) Sustainably maintain the radiological safety, including the physical one, of the objectives that manage the RAW and/or the radioactive materials, monitor, supervise, conduct the RAW inventory and report (2018-2026 and beyond unlimited).

31. The persons in charge, associated costs and progress indicators are reflected in the Action Plan in Annex 2.

VII. REPORTING AND MONITORING PROCEDURES FOR THE STRATEGY IMPLEMENTATION

32. Over the process of conducting this Strategy, the NARNRA will periodically submit monitoring reports to the Government, which will contain the following aspects:

1) Situation change within the Strategy stages implementation process;

2) Radiological, social, ecological etc. impact;

3) Costs of implementing certain phases;

4) Degree of compliance by those responsible for implementing timeframes, costs and content of actions within the Implementation Plan;

5) Reasons for non or partial execution of the implementation stages.

33. The regular reports submitted by the Government to the Parliament shall be prepared based on their own assessments and reports of the parties (institutions) involved in implementing this Strategy.

As part of the annual monitoring, summary reports shall be drawn that are to include information on the implementation of indicators for each separate action and every 3 years, assessment and progress Reports, which will determine the impact of the activities carried out in a certain period of time and the level of implementation of the set objectives, shall be also drawn.

The monitoring and evaluation reports are drawn and submitted to the Monitoring Group (consisting of representatives of NARNRA, Civil Protection and Emergency Situations Service (hereinafter - CPESS) and legal persons authorized in the RAW management field) for generalization and submission to the Government.

The evaluation reports will necessarily include conclusions and recommendations on correcting the deficiencies identified during the evaluation process. At the end of the Strategy implementation, a final evaluation Report, which will contain information about the extent of reaching the objectives and the expected impact, shall be drawn.

34. In order to ensure the active participation of the civil society and relevant institutions in the process of formulating suggestions or comments, as well as for disseminating information on the implementation progress of the action plan, NARNRA of the Ministry of Environment (hereinafter - MoE) and CPESS representatives of the Ministry of Interior (hereinafter - MoI) shall organize and hold conferences, seminars, roundtables etc. To ensure transparency, special sections shall be created on the official websites of the mentioned institutions, where the current information on the Strategy implementation is to be placed.

Technical methods for RAW management
while conducting the 2017-2026 National Strategy on Radioactive Waste Management

Types of waste	RAW Class	RAW generation source	Treatment	Final concentrated form	Condition form	Purified concentrated form	Purified concentrated form	The method for the conditioned RAW storage or final disposal
Solid waste	Exempted RAW	Miscellaneous	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
	Extra-low activity RAW	Miscellaneous, including the ones arising from dismantling or decommissioning of the nuclear or radiological installations	Shredding Storage for disintegration	Solid	Not applicable	Solid	Release under a recyclable form	Temporary storage or surface storage
	Low activity RAW	Miscellaneous, including the ones arising from dismantling or decommissioning of the nuclear or radiological installations	Compaction super-compaction, incineration, fragmentation	Solid, ashes	By cementation, bitumen use, Container packaging	Not formed	Low activity radioactive gases may form	Temporary surface storage or storage in BOSS type probes
	Medium activity RAW	Miscellaneous, including the ones arising from dismantling or decommissioning of the nuclear or radiological installations	Compaction super-compaction, incineration, fragmentation	Solid, ashes	By cementation, bitumen use, Container packaging	Not formed	Low activity radioactive gases may form	Temporary surface storage or storage in BOSS type probes

	High activity RAW	Used radioactive sources	Encapsulation, re-encapsulation	Not applicable	By cementation, bitumen use, Small diameter container packaging	Not formed	Not formed	Temporary surface storage or storage in BOSS type probes
Liquid waste	RAW Class	RAW generation sources	Treatment	Final concentrated form	Conditioned form	Purified concentrated form	Purified conditioned form	Stocking or final storing method of the conditioned RAW
	Exempted RAW	Miscellaneous	Environmental release	It is not formed	Not applicable	Not applicable	Not applicable	Not applicable
	Extra-low activity RAW	Miscellaneous, including the ones arising from dismantling or decommissioning of the nuclear or radiological installations, radiochemical or medical activities	Storage to disintegration, evaporation, filtration, ion exchange	Saline concentrates. Used resins and filters	Cementation	Water	Environmental release	Temporary stocking or surface storage
	Low activity RAW	Miscellaneous, including the ones arising from dismantling or decommissioning of the nuclear or radiological installations, radiochemical or medical activities	Storage to disintegration, evaporation, chemical treatment (co-precipitation), filtration, ion exchange	Saline concentrates. Used resins and filters	Cementation	Water	Environmental release	Temporary surface storage or storage in probes of BOSS type or of other type

	Medium activity RAW	Miscellaneous, radiochemical or medical activities, leaks from the used radioactive sources	Storage to disintegration, evaporation, chemical treatment (co-precipitation), filtration, ion exchange	Saline concentrates. Used resins and filters	Cementation	Water	Environmental release	Temporary surface storage or storage in probes of BOSS type or of other type
	High activity RAW	Miscellaneous, radiochemical or medical activities, leaks from the used radioactive sources	Storage to disintegration, evaporation, chemical treatment (co-precipitation), filtration, ion exchange	Saline concentrates. Used resins and filters	Cementation	Water	Environmental release	Temporary surface storage or storage in probes of BOSS type or of other type

Annex 1 to Parliament Law No. 68

of 13.04.2017

ACTION PLAN
for the Implementation of the provisions of the 2017-2026 National Strategy
on the Radioactive Waste Management

No.	Specific Objectives	Practical Actions to Implement the Objectives	Deadlines	Associated Costs, Financing Source	Agencies in Charge With the Implementation	Indicators of Progress or Achievement	Reporting Procedures
1	2	3	4	5	6	7	8
1	Implement the RWA management standards and procedures used internationally	1.1 Develop the access routes infrastructure to the unit and internal communications (roads)	January 2017-December 2019	MDL 2 mln the State Budget, Capital investments	MoI, CPESS	Completed project (The Technical Cooperation Department of AIEA)	Annual reports (December) on the works implementation
		1.2 Create the infrastructure for delimited and controlled Area for the Point of RWA conditioning	January 2017-December 2019	MDL 0,7 mln. the State Budget, Capital investments	MoI, CPESS	Controlled and supervised areas for the conditioning point	Annual reports (December) on the works implementation
		1.3 Launch the RWA selection and treatment line	January 2017 - December 2019	MDL 0,3 mln. the State Budget, Capital investments	MoI, CPESS	The functional production line; RWA, selected and conditioned	Commissioning documents for the selection line (November 2018)

		1.4 Upgrade the point of disabling the transport and protection vehicles with the reconstruction of water supply system and sewerage of the institution	January 2017-December 2020	MDL 5,0 mln. the State Budget, Capital investments, National or international grants	MIA , CPESS	Decommissioning point; the water supply and sewerage renewed and functional	Commissioning documents (November 2020)
		1.5 Develop or change the related legislation	January 2017-December 2026	MDL 0,2 mln the State Budget	LM, NARNRA Ministry of Health	Regulation, elaborated and approved	Annual reports (December) on the elaborated regulation
		1.6 Create the laboratory for the radionuclide and physical-mechanical characterization	January 2017-December 2020	MDL 3,0 mln. the State Budget, National or international grants	MoI, CPESS	Authorized functional laboratory	Commissioning documents (November 2020)
		1.7 Develop/Change (review) the statute or the regulation for the "Special Items" on extending the specific activity	January 2017 - December 2019	the State Budget	MoI, CPESS	Regulation, elaborated and approved	Elaborated and approved regulation (December 2018)
2	Ensure the radiological, nuclear and physical security, as well as the protection of the workers and of the population from radiation, at present and in the future	2.1 Implement authorization related activities in order to implement the RWA technological management processes	January 2017-December 2026	MDL 0,1 mln the State Budget	MoI, CPESS LM, NARNRA	Complete application authorization file; Technological processes Authorized RWA management technological processes	Annual reports (December) on the permits held with the established limits and work conditions

		2.2 Conduct technological RWA management activities through pre-treatment facilities associated with the radioactive sources through reducing the volume (removal, dismantling the associated facilities), their conditioning, placing radioactive sources in containers, and approved containers.		January 2018-December 2026	MDL 5,0 mln. the State Budget, National or international grants	MoI, CPESS	Classified, categorized and conditioned number of the RWA parcels according to the requirements in force	Annual reports (December) on NARNRA/ National Agency for the Regulation of Nuclear and Radiological Activities on the number of the RWA parcels
		2.3 Decommission the underground storage of the "Radon" type	2.3.1 Draw the decommissioning and radiation safety insurance programme	January 2020-December 2021	MDL 1,5 mln. the State Budget, National or international grants	MoI, CPESS NARNRA	Elaborated and approved programme	Notification (November 2021) on the implementation of the decommissioning operational programme
			2.3.2 Develop the radiation safety case	January 2020-December 2023	MDL 1,0 mln. the State Budget, National or international grants	MoI, CPESS	Radiological authorization for decommissioning issued based on the positive evaluation of the radiological safety	Reviewed and approved file to ensure radiation safety (Safety case) (November 2023)
			2.3.3 Train the employees in decommissioning	January 2020-December 2022	MDL 0,4 mln. the State Budget, National or international grants	MoI, CPESS NARNRA	Trained employees	Annual reports (December) on training
			2.3.4 Create the infrastructure for decommissioning, according to the feasibility study	January 2021-December 2023	MDL 19,5 mln. the State Budget, National or international grants	MoI, CPESS NARNRA	Equipped area, prepared for radiological decommissioning under safe circumstances. Procured and installed equipment.	Annual reports (December) on infrastructure development
			2.3.5 Decommissioning the store	January 2023-	MDL 8,2 mln. the State Budget,	MoI, CPESS NARNRA	Decommissioned stores, sorted and conditioned RWA, restored land	Annual reports (December) on action achievement

			December 2026	National or international grants			
		2.4 Implement RWA quality management program	January 2018-December 2026	MDL 0,1 mln. the State Budget, National or international grants	MoI, CPESS	Implemented ISO 9001 system	Audit or conformity assessment annual reports (December)
3	Develop the research programmes related to the RWA management until the final disposal, methods to reduce the impact of long-life radionuclides on the population's health and the environment, and patterns concerning the migration of the radionuclides in the environment	3.1 Develop the feasibility study on the use of final disposal system	January 2018-December 2021	MDL 3,4 mln. the State Budget, National or international grants	MoI, CPESS	Feasibility study prepared with report, conclusions, proposals and recommendations on the final disposal method	Approved report (December 2021) on the study development and final report presentation
		3.2 Develop the radiological monitoring programme for the RWA management by establishing the radiological impact derived from the "Special Items" activity on the effective collective dose for the population	January 2018-December 2020	MDL 0,6 mln. the State Budget, National or international grants	Hydro meteorological Service, National Centre for Public Health	Publish reports on the radio-ecological expertise	Annual reports (December) on the radiological impact on the environment
		3.3 Establish through scientific researches of the most relevant fixing matrices (immobilization) of radionuclides from the packages	January 2017-December 2023	MDL 1,0 mln. the State Budget, National or international grants	the Academy of Sciences of Moldova	The number of research reports	Annual reports (December) on the relevant fixing methods
4	Sustainable maintenance of safety radiation (physical ones including), of the RWA managing objectives and / or radioactive materials	4.1 Detect, identify, collection and transport radioactive sources and orphan sources (materials) radioactive resulting from the radiological incidents/accidents	In need	From the reserve fund of the Government or from national or international grants	NARNRA, MoI, CPESS	Radioactive sources , collected, identified, transported, processed and stored radioactive materials	Annual reports (December) on the collection of orphan sources. Delivery and receipt documents.

		4.2 Reassess the physical security of nuclear/radiological facilities in the RWA management and/or transportation process and of the radioactive sources	Constant at request and authorization at their identification stage	MDL 0,2 mln. the State Budget, National or international grants	NARNRA MoI, CPESS	Permits, re-evaluation documents, records and prescriptions; the number of nuclear and radiological objectives assessed	Annual reports (December) on transportation or management of the radioactive materials
		4.4 Strengthen the physical barriers of the "Special Items"	January 2018-December 2020	MDL 1,7 mln. the State Budget, National or international grants	MoI, CPESS		Annual reports (December) on the construction/reconstruction of physical barriers on specialized objects
5.	Develop and train human resources involved with the RWA and their improvement in entities operating with radioactive sources or RAW management	5.1 Develop and/or recognize training centres for the RWA management personnel	upon request	MDL 1,1 mln. the State Budget, National or international grants	LM, NARNRA	Construction / reconstruction of the strengthened and maintained functional physical barriers that are functional. Number of created and/or recognized training centres	Annual reports (December)
		5.2 Training activities and vocational training in the RWA management	Constant	MDL 0,5 mln. the State Budget, National or international grants	Ministry of Education the Academy of Sciences of Moldova	Number of the issued training certificates Number of the issued exercise Permits	Annual summary reports (December) for NARNRA
		5.3 Knowledge assessment of the staff responsible with RWA management	Once every 5 years	the State Budget	NARNRA	Number of the issued exercise Permits and training certificates	Annual summary reports (December)
6	Ensure the maintenance of technical equipment associated with the RWA management in order to	6.1 Implement periodic maintenance facility actions (of the radioactive sources premises), of the equipment	Constant	MDL 1,2 mln. National or international grants	MoI, CPESS	Number of Security certificates; Number of issued maintenance acts and CAS acts installations	Annual summary reports (December) for NARNRA on the technical conditions of facilities

	increase RWA management sustainability						
7	Ensure funding for the RWA management system, according to "the polluter pays" principle.	7.1 Implement Law No. 132 of 08.06.2012 on the safety development of nuclear and radiological activities by creating special funds for the RWA management through implementing a sustainable mechanism for funding the RWA management field	Constant	the State Budget	Government	Secured funding of the RWA management	Annual reports (December) on the funding allocation
8	Inform the public on the with RWA management, taking into account the sensitive nature of the information regarding the physical security of the radiological targets containing RWA, on other information protected by law, and ensure public participation in the decision-making process.	8.1 Inform and attract the civil society in the decision-making process on the RWA management, including the final disposal	constant	MDL 0,5 mln. National or international grants	LM, NARNRA, MoI, CPESS	Number of meetings, programmes, articles in the media, roundtables, press conferences	Annual reports (December) on informing the society through the media, the official website of LM, NARNRA and MoI, CPESS
		8.2 Roundtables and public debates on the selection of the construction site of the final RWA disposal point	January 2024-December 2026	MDL 0,6 mln. National or international grants	LM, NARNRA MoI, CPESS	Number of reports and minutes of meetings for public debate	Annual reports (December) on organizing public debates and roundtables
9	Database management (National Register of the Radioactive Waste) of the information on the entire RWA inventory	9.1 Fund the National Register of Radioactive Waste (with the possibility of the operator's access to their own data)	Starting 2017	the State Budget	LM, NARNRA	Number of inventoried and updated RWA; complete coverage for the database of the amount of RWA stored	Annual reports (December) on the amount and type of the stored RWA
		9.2 Continuous RWA inventory through annual inventory of used radioactive sources and RWA	constant	the State Budget	LM, NARNRA	Updated number of RWA Complete coverage for the database of the amount of stored RWA	Annual reports (December) on the amount and type of the stored RWA