



Republic of Latvia

National Report on the implementation of the obligations under the Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management

6th Review Meeting of the Contracting Parties

Radiation Safety Centre of the State Environmental Service
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Section A

Introduction

Decision about accession of the Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (hereinafter - the Convention) was made by the Government on 2 February 2000¹. Latvia acceded to the Convention after deposition of the accession document on 27 March 2000 consequently Latvia became the Contracting Party to the Convention on 18 June 2001. Latvia has participated in all Review Meetings.

Latvia submits the present report for the sixth Review Meeting of the Convention which is planned at International Atomic Energy Agency in May 2018. This report demonstrates how Latvia meets the main objective of the Convention - to achieve and maintain a high level of safety in spent fuel and radioactive waste management, through the enhancement of national measures and international cooperation, including safety-related technical co-operation.

Based on legal requirements and outcomes from the previous Review meetings Latvia noted that there are two basic commitments for each Contracting Party:

- to prepare and make available a National Report for review,
- to submit National Report to a peer review by the other Contracting Parties.

Therefore, as it was done also in the past, Latvia:

- prepared the 6th National Report,
- made it accessible for other Contracting Parties by posting the National Report on the Convention web site,
- is ready to review National Reports of other Contracting Parties,
- after receiving the questions and comments about our report will prepare and post answers on Convention web site,
- will actively participate in Review Meeting.

This report has been prepared by the Radiation Safety Centre of the State Environmental Service to meet the requirement of Article 32 of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management. It considers each of the Convention's obligations and explains how Latvia addresses them.

Latvia recognizes that preparation of the National Report includes a self-assessment and implementation of the safety enhancement measures to meet national and international obligations. We are sure, that international review provides plenty of opportunities for learning from others and the review of the National Report by our peers ensures clarification of issues of special interest, which will serve to justify improvements for action program to enhance safety of radioactive waste management.

The scope of this report is limited to those articles from Convention, which are relevant to the particular situation in Latvia, as Latvia does not possess any spent fuel management facility and all spent fuel from research reactor is already sent back to the country of its origin.

The report is structured according to the Guidelines for national reports under the Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management established by the Contracting Parties to the Convention (INFCIRC/604/Rev.3). Report is a comprehensive compilation and has been updated on the basis of past reports. It

¹ The Order of the Cabinet of Ministers No.50 of 2 February 2000, (Latvijas Vēstnesis) 36/37, 04.02.2000.

contains changes and new developments since the last report.

This report is available online at State Environmental Service website www.vvd.gov.lv.

Framework of supervision and implementation

There are three main bodies, which have competences relevant to the Joint Convention:

1. Ministry of Environmental Protection and Regional Development – policy maker (elaborate, organize and coordinate issues related to radiation and nuclear safety),
2. Radiation Safety Centre of State Environmental Service - the national regulatory authority,
3. Main operator State limited liability Company “Latvian Environment, Geology and Meteorology Centre” (hereinafter - Centre) - the radioactive waste management operator with their direct subunit radioactive waste repository “RADONS” at Baldone site (hereinafter – repository RADONS).

Radiation Safety Centre of State Environmental Service (hereinafter - RSC) is central structural unit of State Environmental Service, which according to the Law on Radiation Safety and Nuclear Safety has licensing, supervising and controlling functions, and it also maintains relevant databases in radiation safety and nuclear safety field.

The Centre is the operator of the repository RADONS at Baldone site and Salaspils research reactor (under decommissioning). In addition Centre provides technical services of environmental monitoring, dosimetry service and management of radioactive waste.

Major developments since the previous national report:

- Development of the Radioactive Waste Management Programme (included in Environmental Policy Strategy 2014-2020 and approved by Cabinet of Ministers on 10 May 2017)
- Long term safety assessment of near-surface radioactive waste repository RADONS in 2016
- Partial financing from state budget resources has been allocated for decommissioning package of measures (including construction of the radioactive waste vault and interim storage in radioactive waste repository RADONS)
- In compliance to European Union (EU) requirements, in 2016-2017 preparations have begun for international assessment of nuclear safety and radioactive waste management system to be performed in 2019 (Integrated Regulatory Review Service (IRRS) and Integrated Review Service for Radioactive Waste and Spent Fuel Management, Decommissioning and Remediation (ARTEMIS) Mission). Self-assessment is carried out to prepare a Preliminary National Action Plan. In addition several management system improvements are implemented by developing documented procedures for authorization and inspection functions of National regulatory authority - RSC.
- Strengthening of institution (including the regulatory authority) expertise and skills has been continued by involvement in IAEA technical cooperation programmes, as well as opportunities offered by other foreign institutions and organisations.

Section B

Policies and practices

There are no changes in national policy regarding the use of nuclear power in energy sector. Latvia has no nuclear power plants and there is no intention to build such plant in Latvia.

Latvia recognizes:

- that the operation of nuclear research reactor has generated spent fuel and radioactive waste as well as other applications of nuclear technologies also generate radioactive waste. Moreover, the decommissioning of research reactor will generate much larger amount of radioactive waste than during its operational period;
- that main objectives for any society are to ensure safe management of spent fuel and radioactive waste;
- the importance to the international community of ensuring that good practices are planned and implemented for the safety of spent fuel and radioactive waste management, because only joint activities could solve technical issues and safety concerns;
- that the non-compliance of radiation safety in one single country could imply stronger requirements in other countries and reduce public acceptance for such practices;
- the importance of informing the public on issues regarding the safety of spent fuel and radioactive waste management due to a vital need for public acceptance as waste management activities lead to long term impacts and significant investments, therefore without such acceptance it is impossible to reach safety objectives;
- that requirements for public information are defined as obligations under other environmental protection agreements, which also have direct relation to the constitutional rights of citizens;
- that the ultimate responsibility for ensuring the safety of spent fuel and radioactive waste management rests with the State.

Latvia recognizes the importance to develop national strategy and long term plans for radioactive waste management. Currently Latvia has concept regarding low level waste disposed in repository RADONS.

During the period of 2016–2017 Latvia has developed Radioactive Waste Management Programme. Programme is included in Environmental Policy Strategy 2014-2020 and approved by Cabinet of Ministers on 10 May 2017. Programme is developed based on principles arising from Latvian legal acts and international documents including Convention and Council Directive 2011/70/Euratom of 19 July 2011 establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste. Management of radioactive waste and also future plans (including long-term plans) is covered by the programme.

Section C

Scope of application

Latvia has no nuclear fuel or spent nuclear fuel and therefore has no intention to use reprocessing services, the spent nuclear fuel defined as the radioactive waste. This issue is incorporated also in the framework law that spent nuclear fuel may be processed as an eligible resource or intended for complete disposal without the further use thereof and treated as radioactive waste. The use of spent nuclear fuel shall not be permissible in the Republic of Latvia. Importation of spent nuclear fuel into the Republic of Latvia from other countries shall not be permissible.

There are no large scale facility or processes in which natural occurring radioactive materials are processed and are treated as radioactive waste, but there were several incidents with enhanced radioactivity of metal scrap imported from other countries for the metal smelting plant, thus minor amounts of such materials had been treated as radioactive waste.

Latvia has no military facility which generates spent nuclear fuel, currently minor amounts of radioactive waste from defence related activities (e.g. markers on the guns with radium containing luminescent paint) are treated in the same manner as civilian radioactive waste.

In the past (during the time period under former Soviet Union) national radioactive waste management repository RADONS has received relatively large amount of defence related radioactive waste, which still constitute significant part of total radioactivity of the disposed radioactive waste. More detailed information could be found in the first national report [Section I, Annex (g)].

Section D Inventories and lists

In Latvia there are no nuclear power plants as well as spent fuel management facilities. The only two facilities for which Article 32 of the Joint Convention are applicable:

1) radioactive waste near-surface repository RADONS

The national repository RADONS is designed for disposal of low and intermediate level waste. The total radioactivity of waste accepted for disposal or long term at the end of 2017 is around $3,1 \times 10^{14}$ Bq and total volume about 890 m³. Detailed inventory lists of amount of radioactive waste are given in the Annex B. Currently the expansion of repository RADONS is in process (see Section K).

2) the shutdown Salaspils research reactor

The shutdown Salaspils research reactor is located at Salaspils, 25 km from Riga. It was designed and constructed by the Soviet Union as a derivative of the IRT-1000 reactor (pool-type light water reactor) originally built at the Moscow Kurchatov Institute in the late 1950's. Salaspils research reactor was put into operation in 1961. In 1979 the secondary cooling system was reconstructed and the thermal power increased to 5 MW. After modifications the reactor fuel had an enrichment of 90% ²³⁵U, which motivated strict security measures. Salaspils research reactor was shut down in June 1998. The spent fuel has been moved out of Latvia in 2008 and has been returned to the supplier – Russia Federation. The fresh fuel had been moved out of Latvia in 2005.

Radioactive waste in Latvia originates exclusively from civilian programmes. The main potential producers of radioactive waste are:

- 1) traditional areas, among them the most significant source of foreseen waste is industry: irradiation, nuclide gauges, calibration (137-Cs) and well logging (Am-Be);
- 2) specific areas:
 - decommissioning of Salaspils research reactor - the foreseen total volume of radioactive waste has been assessed ~ 1200 m³;
 - management of contaminated scrap metal, which was imported either for reprocessing or transit purposes.

On the whole there are about 1010 operators under supervision and control of the RSC, among them only 48 operators generate radioactive waste (Table 1):

Table 1

The use of radioactive sources by operators in various practice areas

Area of practice	Amount of operators using radioactive sources
Medicine	6
Industry	22
Baggage and cargo control	5
Research (including laboratories)	10
Service providers	2
Management of radioactive smoke detectors	3
Total	48

Section E

Legislative and regulatory system

Article 18

Implementing measures

Obligations under the Convention have been implemented in national laws and Cabinet of Ministers regulations; besides, the Concept of the Management of Radioactive Waste defines some additional tasks and measures related to international conventions. The list of relevant legal documents is provided in the Section I, Annex (f).

During the period of 2016–2017 Latvia has developed Radioactive Waste Management Programme². Programme is developed based on principles arising from Latvian legal acts and international documents including Joint Convention on the Safety of Spent Fuel Management and the Safety of Radioactive Waste Management, and Council Directive 2011/70/Euratom of 19 July 2011 establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste. Information regarding management of radioactive waste and also future plans included in the programme. One of the planned activities is the construction of two new vaults and interim storage for long lived waste building in repository RADONS.

Article 19

Legislative and regulatory framework

There are three types of legal acts in Latvia: primary national legislation, secondary legislation (regulations) and EU legal acts:

1) The main law is the Law on Radiation Safety and Nuclear Safety. In parallel with this framework law, there is also a set of international agreements ratified or acceded by Latvia and several general legal acts, which have some provisions relevant to the Convention (e.g. building codes, administrative and criminal acts).

2) The secondary sources for Latvia's legal system are regulations and orders issued by the Government (Cabinet of Ministers).

Majority of applicable regulations are issued on the basis of the Law on Radiation Safety and Nuclear Safety, but some - based on other primary legal acts (e.g. the Cabinet Regulations on Procedures for Building of Facilities Related to Radiation Safety, No.661 (24.11.2015.) were issued based on Construction Law (09.07.2013.), but the Cabinet Regulations on State Environmental Service Statute, No.962 (23.11.2004) covering Radiation Safety Centre authority were issued based on State Administration Structure Law).

3) The third source of law for Latvia, as for any other EU member state, is Euratom Treaty. Latvia has made all efforts to harmonize its national legislation with the legal provisions set in force within EU.

The Law on Radiation Safety and Nuclear Safety came into force on 26 October 2000. The law governs all activities involving radioactive or nuclear materials and all sources of ionizing radiation. It establishes the basic principles of radiation and nuclear safety (justification, optimisation and limitation) and also contains provisions on nuclear third party

² Radioactive Waste Management Program is included in Environmental policy strategy 2014-2020 and approved by Cabinet of Ministers on 10 May 2017.

liability. The main provisions for radioactive waste management are set in the Cabinet Regulations “Practices Involving Radioactive Waste and Related Materials” No.129 (19.03.2002).

Operators must provide all necessary information to the RSC showing that safety measures are being applied. The RSC may at any time withdraw or revoke licenses if radiation protection and nuclear safety requirements are not met.

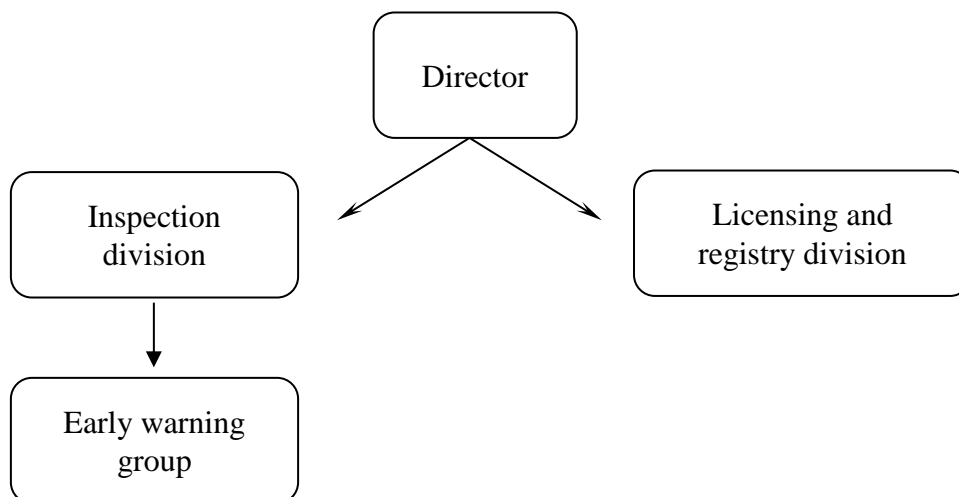
Article 20

Regulatory body

RSC was established in July 2001 based on framework Law on Radiation Safety and Nuclear Safety, which entitled the Government (the Cabinet of Ministers) to issue regulations “Statutes of Radiation Safety Centre” and also empowered the Cabinet of Ministers to issue (in majority of cases re-issue updated regulations, because the system for radiation and nuclear safety was established already in 1994 based on the previous act with the same title) regulations, which were needed to implement legal requirements prescribed by this act.

According to amendments in framework law, adopted in June 12, 2009, changed its status to central structural unit of State Environmental Service which is under supervision of the Ministry of Environmental Protection and Regional Development. The RSC is the national regulatory authority in the field of radiation and nuclear safety. RSC has licensing, supervisory and control functions, maintains relevant databases. RSC together with representatives from other state institutions and professional associations deals with certification and recognition of radiation and nuclear safety experts.

Organizational structure of the RSC:



Functions and duties are prescribed by the Law on Radiation Safety and Nuclear Safety. More detailed duties, rights and working procedures are defined in regulations approved by the Cabinet of Ministers. Main functions of the RSC related to implementation of the Convention are defined by legislation, and include to:

- draft policy proposals for supervision and control of radiation and nuclear safety;
- supervise and control radiation safety;
- license practices with radiation sources;

- coordinate combat of illicit trafficking of radioactive and nuclear materials;
- encourage introduction of new technologies to minimize the possible harmful effects;
- co-ordinate technical cooperation in the field of radiation safety;
- prepare national reports;
- assess implementation of international recommendations;
- maintain data bases on practices, sources and exposures.

The law on state institutions in details prescribes system of supervision - in short, there is no rights for the supervisor directly affect decisions on the subject matters, only financial control and compliance with requirements from the Law on State civil servants. Thus recommendations about independency are implemented.

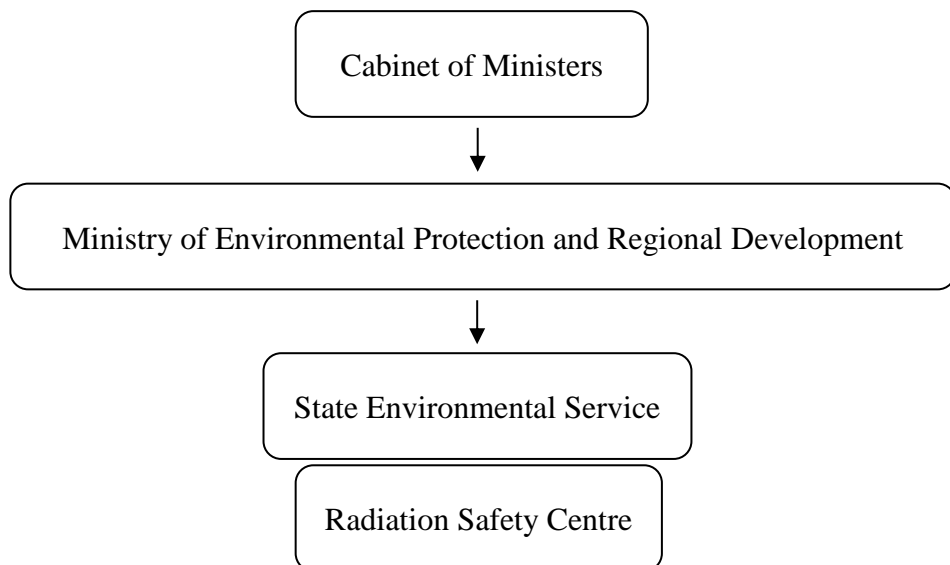
To ensure consistency in decision making RSC has implemented relevant changes in the management system in the last years by developing and enforcing documented procedures for licensing (authorization) process and inspection process. To facilitate application of legislative and regulatory requirements RSC has developed various guidelines for the operators regarding the authorization process.

The main problem issue still remains staffing and availability of resources for activities of the regulatory authority. Since last review meeting significant staffing in RSC has taken place and considerable attention has been paid to new staff training and staff capacity building in RSC. Additionally RSC has implemented several upgrades of its technical capabilities (e.g. measuring equipment).

The finances for RSC are granted annually by Saeima (the Parliament) as separate budget line under budget of State Environmental Service. The RSC does not have its own income since changes in its status in 2009.

The system of state authority under supervision of relevant ministry, which has no functions in the uses and promotion of nuclear energy, assures that RSC is an independent national authority and can implement its decisions also independently from its supervisor.

Place of the regulatory body in the governmental structure:



Section F

Other general safety provisions

Article 21

Responsibility of the license holder

According to the Law on Radiation Safety and Nuclear Safety the license holder has prime responsibility for radioactive waste.

To obtain a license, the applicant must submit an application, which along with other documents, is reviewed by RSC. Before issuing a licence for such activities, that may result in creation of radioactive waste, the RSC shall request information from the operator regarding the foreseeable amount of radioactive waste and measures that will be taken to manage this radioactive waste.

A license is valid for ten years. However, any license may be subject to revocation if a violation of safety standards is detected during inspection. Upon expiration, the license is not automatically renewed, and a new application has to be submitted.

The operator whose activities with sources of ionising radiation generate radioactive waste shall be responsible for:

- safe radioactive waste management;
- the selection of such designing activities, operations and techniques of disposal which ensure that the volume of radioactive waste and radioactivity level are as low as practically possible;
- financial, technical and worker resources for safe operations with radioactive waste and materials related thereto;
- covering the radioactive waste management costs;
- keeping records of radioactive waste;
- covering the costs of transfer of radioactive waste to the disposal site.

Centre is the only organisation in Latvia which is dealing with management of radioactive waste. Centre also is the license holder (research reactor) for the relevant activities subject to the Convention (till 2015 - University of Latvia), in particularly for ensuring safe maintenance of relevant equipment of the nuclear reactor as well as for a complete cycle of radioactive waste management.

Article 22

Human and financial resources

Adequate provision of financial and human resources is a prerequisite in ensuring safe management of radioactive waste and achieving improvements in radiation safety culture. According to the Law on Radiation Safety and Nuclear Safety and Cabinet Regulations "Practices Involving Radioactive Waste and Related Materials" No.129 (19.03.2002), operating facility is required to allocate adequate financial and human resources and to ensure relevant training of the personnel.

Centre which is responsible for safe management of repository RADONS and Salaspils research reactor is mainly financed from the State Budget. The Ministry of Environmental

Protection and Regional Development explains and gives proof to the Government concerning adequate funding for each fiscal year and long term programmes. The Ministry of Environmental Protection and Regional Development provides also extra funds from its resources (including extra-budgetary resources from Latvian Environmental Protection Fund) and assists in finding donors by maintaining cooperation with international organisations. For decommissioning of research reactor and for implementation of the Concept of Radioactive Waste Management the Government has allocated additional financial resources in period 2015-2019.

However, the lack of human resources (in operating facilities and in regulatory authority) and the limitation of training in radiation safety currently available in Latvia has been recognised in the Environmental Policy Strategy 2014-2020. To solve this problem involvement in training events offered by IAEA or other international institutions as well as other countries is pursued.

Article 23 **Quality assurance**

Development of quality assurance programme is required by the Cabinet Regulation No.752 „Procedures for Licensing and Registration Activities with Sources of Ionising Radiation” (22.12.2015.) and by the Cabinet Regulation No.149 “Protection against Ionising Radiation” (09.04.2002).

Any facility (especially facilities of state significance) is required to have a quality assurance programme.

Provision for the requirements to be complied with before applying for a licence is included in Cabinet Regulations No. 752. According to that operator shall:

1. ensure the compliance of employee qualifications with the duties to be performed;
2. ensure the development of a radiation and nuclear safety quality assurance programme.

Therefore the quality assurance programme is one of the main documents for operations with sources of ionising radiation. Accordingly one of the main tasks for inspectors of RSC is to control the implementation of quality assurance programs.

Additional requirements for quality assurance programmes are described in Regulations on Radiation Protection during the Transport of Radioactive Materials (including radioactive waste) as well.

Centre has implemented a quality assurance system, which complies with all aforementioned requirements, and accordingly RSC has issued the licence for activities with ionising radiation sources. In 2016 new quality assurance programmes for repository RADONS and Salaspils research reactor were developed. Centre has also accreditation for certain laboratory activities under ISO 17025 standard.

RSC has developed several guidelines for operators to facilitate the licensing (authorization) process as well as to ensure consistent improvement of radiation safety culture. These guidelines about the authorization process, about carrying out radiation monitoring and preparing assessment of radiation safety (assessment is prepared by radiation safety and nuclear safety experts) are published on State Environmental Service website. Guidelines on development and on the content of radiation safety quality assurance programmes are in the process of being published.

In addition to ensure consistency in decision making process and to ensure application

of radiation safety culture in the regulatory authority, RSC has updated and developed management system procedures for licensing (authorization) and inspection processes.

Meanwhile the self-assessment is carried out to prepare for IRRS and ARTEMIS missions that have been invited to take place in 2019. Results of self-assessment will be used to establish the Preliminary national action plan that will be revised after the results of missions are received.

Article 24

Operational radiation protection

Operator is responsible for radioactive waste and before starting practices operator estimates the expected amount of radioactive waste and the measures that will be taken to manage this radioactive waste, operator develops quality assurance programme and emergency plan, and described the measures to be taken to control the discharges and unplanned/uncontrolled releases. During the operating lifetime operator is responsible for implementation of safety requirements.

Discharges are specified and quantitatively limited by Cabinet Regulations “Practices Involving Radioactive Waste and Related Materials” No.129 (19.03.2002). Environmental situation is controlled in accordance with the control programs for national monitoring and also by operator. Results of environmental monitoring for repository RADONS and Salaspils research reactor are available on Centre website (<https://www.meteo.lv/lapas/vide/radiacijas-objekti/radiacijas-objekti?id=2065&nid=1022>).

The System of Accounting for and Transfer of Radioactive Waste of repository RADONS provides that all physical objects being in the control zone of the research reactor and not being necessary for its further maintenance, initially are considered as radioactive waste or related materials. RSC regularly receives reports from the operator and approves the free release of exempted materials.

Additional dose limits related to radioactive waste management are specified in Cabinet Regulations “Practices Involving Radioactive Waste and Related Materials” No.129 (19.03.2002). If, based on the results of environmental monitoring and on the long-term safety assessment, it is identified that the potential exposure dose to the members of the public living in the direct vicinity of a radioactive waste disposal facility, is:

- 1) above or equal to 5 mSv/year, obligatory measures must be taken to bring the situation to normal and to reduce radiation dose less than 300 μ Sv/year,
- 2) between 1 and 5 mSv/year, respective measures must be taken during over the next five years to bring the situation to normal and to reduce radiation dose less than 300 μ Sv/year,
- 3) less or equal to 1 mSv/year, the implementation of measures is considered on the basis of the financial and technical capabilities.

The maximal exposure dose to the critical group of population shall not exceed 100 μ Sv/year, but maximal average dose - 10 μ Sv/year.

The Centre has an emergency response group for mitigating the effects of unplanned release of radioactive materials into the environment, should such occur. There has been no case were radiation workers of Centre received external exposures above 6 mSv/year (1/3 from the dose limit), in majority cases the doses are on the level 1-2 mSv/year, which demonstrate that operational safety measures corresponds to good practices.

Article 25

Emergency preparedness

The Cabinet Regulations on Requirements for Preparedness for Radiological Emergency and Actions in the Event of Such Emergency, No.152 (08.11.2003) prescribe main duties for emergency preparedness (including training). For any nuclear facility, radioactive waste management facility and another significant object emergency preparedness plan shall be prepared and tested before it commences operation agreed by the RSC. The plans shall be agreed also with local municipalities and Fire and Rescue Services. These are preconditions for applicants and the relevant documents are assessed before RSC grants the license.

Centre (as operator) has implemented two local plans, in agreement with relevant local municipalities and Fire and Rescue Services:

- Preparation for and Action in the Case of Accident in Salaspils research reactor. New plan for reactor was developed in 2016;
- Preparation for and Action in the Case of Accident in the repository RADONS (last plan in 2012).

For management of accidents the State Civil Defence Plan is established. The State Civil Defence Plan provides basic principles for emergency preparedness according to radiation and nuclear safety legislation and has requirements for regular testing (including theoretical exercises, table top exercises and practical exercises) and updating of the Plan.

On 5 May 2016 new Civil Defence and Catastrophic Management Law was adopted. According to this Law new Cabinet of Ministers Regulations and new State Civil Defence Plan will be issued 2017-2018. According to the Law Ministry of Environmental Protection and Regional Development is national coordinating authority in case of radiological emergency. The main bodies` in the case of an emergency are:

- RSC - national warning point for radiation emergencies, which is operational 24/7. In case of emergency RSC evaluates available information and provides recommendations for other involved organizations,
- State Fire-fighting and Rescue Service - performs on site actions assigned by State Civil Protection Plan in case of radiological and nuclear events, performs decontamination of persons and means of transport,
- Centre - coordinates and organizes environmental radiation monitoring and is responsible for radioactive waste management, performs decontamination of buildings, soil, ensures emergency services with dosimeters.

Other requirements for the emergency planning and response are set out also in other regulations e.g. on protection against ionising radiation, on safe transport, on licensing etc.

In 2014, improvements of the early warning radiation monitoring system were implemented with support from the EU Cohesion Fund (project No 3DP/3.5.1.4.0/11/IPIA/VARAM/004 „Modernization of early warning radiation monitoring system”). During the project, old monitoring stations were replaced by new spectrometric monitoring stations. Currently 24 new stations are operational throughout the territory of Latvia. There are 20 new stationary spectrometric monitoring stations, one portable spectrometric station, one aerosol monitoring station and two water monitoring stations. Continuous measuring mode provides information about gamma dose rate in the environment. One of spectrometric monitoring station is located in repository RADONS, another – Salaspils

research reactor.

According to the Agreement signed by all states in Baltic Sea region the states concerned have to provide data from their monitoring stations to all parties of the Agreement. Since 2001 RSC participates in EURDEP (European Radiological Data Exchange Platform), which is both a standard data format and a network for the exchange of environmental radiation monitoring data between European countries in real-time. RSC made available the national radiological monitoring data for Joint Research Centre (JRC) Ispra and has access to the data of all other participating countries. In parallel with EURDEP RSC participates in ECURIE program, which is a 24h emergency notification and information exchange system.

To ensure readiness and reaction capabilities for incidents, RSC participates in IAEA communication exercises and RSC regularly organizes practical internal exercises (orphan source search, use of equipment). In 2017 Latvia participated in the international European Disaster Response Exercise (EDREX), which is organised by the European Commission, and IAEA ConvEx 3.

Article 26

Decommissioning

Centre is responsible for decommissioning of the Salaspils research reactor. Decommissioning of the reactor is an ongoing process according to the Cabinet resolution from October 1999, which was slightly modified in 2004. Environmental Impact Assessments for decommissioning and expansion of radioactive waste repository RADONS were accomplished in 2005. Additional studies for updates of decommissioning project including definition for further activities of the site were made and the latest decisions on these subjects were done in July 2007 by the Cabinet of Ministers (the finishing of the review of the EIA final report).

Centre has a licence for safe management of Salaspils research reactor. According to the Cabinet Regulations on Procedures for Building of Facilities Related to Radiation Safety, No.661 (24.11.2015) for decommissioning of reactor it is necessary to receive a special building licence from State Environmental Service and then a licence for decommissioning works from RSC.

Decommissioning and dismantling of the Salaspils research reactor is important planned activity included in Radioactive Waste Management Programme which is planned to be realized till 2020. Unfortunately currently supported financing by Cabinet of Ministers could be insufficient because of economic circumstances (especially increasing of fees of necessary services). Decision-making on allocation of financial resources for carrying out all the activities included in Radioactive Waste Management Programme is still in process.

Section G

Safety of spent fuel management

Article 4

General safety requirements

Since May 2004 several legal documents had been adopted (e.g. EU regulations implemented into national regulations) and modified (some additional provisions from EU directives and recommendations had been incorporated in national regulations), but as already in late 90^{ies} of last century Latvia worked on preparations of legal framework in harmony with system used in EU, there are no major changes regarding spent nuclear fuel.

Article 5

Existing facilities

There are no major changes regarding the existing facilities and there is no nuclear and spent fuel. Latvia used to have a Nuclear Research Centre with a pool type 5 MW IRT research reactor at Salaspils. The Cabinet of Ministers in 1995 made the decision to start preparations for the decommissioning and in 1998 the second decision was made about permanent shutdown of the reactor. Presently Centre manages the decommissioning project of this research reactor.

There was small radioactive waste storage on the site of research reactor (in operation since 1975-2005) where some parts dismantled from reactor core were stored after reconstruction activities in 1975. All the waste after characterisation and re-packing was transferred to the repository RADONS.

Article 6

Siting of proposed facilities

Latvia has no plans to establish spent fuel management facility; therefore these provisions are only partly incorporated in national nuclear legislation.

Should such legal acts be needed, the system and steps for the licensing of nuclear facilities and major modifications to such facilities are prescribed in the Cabinet Regulation "Procedures for Licensing and Registration Activities with Sources of Ionising Radiation" No.752 (22.12.2015), The Law on Environmental Impact Assessment and other relevant Cabinet Regulations governs potential evaluating of relevant site-related factors likely to affect the safety of facility. The Law on Environmental Impact Assessment prescribes requirements for assessment of impact of proposed nuclear facilities on the environment. The mechanism of public hearing is established by licensing regulations. Proper communication with nearby contracting parties of Convention and Nuclear Safety Convention is governed by Convention on environmental impact assessment in a transboundary context (so called Espoo Convention).

Article 7

Design and construction of facilities

As there is no government plan to build any nuclear facility therefore there is no safety issues related to the spent fuel. Nevertheless, these provisions are only partially incorporated in national nuclear legislation. In general legislation, the potential necessary provisions are

introduced by the Law on Radiation Safety and Nuclear Safety, Basic safety regulations and Licensing Regulations. Special construction regulations have been implemented for construction of sources of ionising radiation of national level, with requirements for obtaining a building permit, building design, and construction work.³

Article 8

Assessment of safety of facilities

As there is no government plan to build any nuclear facility therefore there is no safety issues related to the spent fuel. Nevertheless, provisions related to the safety assessment for nuclear facility are only partly incorporated in legislation because currently no new facility is planned. Should such necessity be raised, the legal basis for the safety impact assessment is given in the Law on Environmental Impact Assessment.

Article 9

Operation of facilities

As there is no government plan to build any nuclear facility therefore there is no safety issues related to the spent fuel. Nevertheless, RSC regularly provides inspections to verify compliance with legal requirements - according the Law on Radiation Safety and Nuclear Safety any nuclear facility is “ionising radiation facility of state significance”, thus according the roles of procedure for RSC the regular planned comprehensive inspections are carried out not less than 4 times per year, in addition to regular topical inspections are organised (e.g. on safeguards issues together with IAEA and EU inspectors) and for any safety significant activity, which is planned by the operator.

Article 10

Disposal of spent fuel

The spent nuclear fuel has been moved out of Latvia in 2008 in accordance with internationally agreed practice - return to the supplier and there is no spent fuel in territory of Latvia.

³ The Cabinet Regulations on Procedures for Building of Facilities Related to Radiation Safety, No.661 (adopted on 24.11.2015.) (*based on Construction Law*)

Section H

Safety of radioactive waste management

Article 11

General safety requirements

The following legal acts directly governing radioactive waste management are:

- The Law on Radiation Safety and Nuclear Safety sets general safety provisions for ensuring that all radioactive waste (including sealed sources) is adequately processed, stored or disposed of under regulatory control;
- Cabinet Regulations “Practices Involving Radioactive Waste and Related Materials” No.129 (19.03.2002);
- Cabinet Regulations “Procedure for Licensing and Registration of Activities with Ionizing Radiation Sources” No.752 (22.12.2015) set requirements for the licensing process (incl. activities with radioactive waste). Before issuing a licence for practices which may result in generation of radioactive waste, the RSC requests information about the projected quantity of radioactive waste and measures to be taken by the operator in relation to such waste;
- The Principles of Determination of the Equivalence of Various Radioactive Waste.

As practices with radioactive waste are in the same time also practices with radiation sources all other regulations are applicable (e.g. basic safety requirements, requirements for physical protection, safe transport, etc.).

A Concept of the management of radioactive waste (approved by the Cabinet of Ministers in 2003) was elaborated, based on:

- IAEA generic principles for radioactive waste management,
- Site-specific conclusions recommendations of CASSIOPEE study on Safety Assessment of repository RADONS.

According to the Law on Radiation safety and Nuclear Safety and Cabinet Regulations “Practices Involving Radioactive Waste and Related Materials” No.129 (19.03.2002) the radioactive waste is classified in several groups, *inter alia*, also according the amount of generated heat power for high activity waste. Information about categories of radioactive waste in repository RADONS is included in Annex B.

Criticality issues are specified in Regulations on Protection against Ionising Radiation in Transportation of Radioactive Materials, which set up also limitations on radioactivity content in packages/containers.

According to the law On Natural Resources Tax and the Law on Radiation Safety and Nuclear Safety - in the case of import into the Latvia of radioactive substances that, after use thereof, generate radioactive waste which needs to be disposed of in Latvia, a natural resource tax is payable on the import of such substances but such situations are very few.

According to the Cabinet Regulations “Practices Involving Radioactive Waste and Related Materials” No.129 (19.03.2002) the operator who plans to import a sealed source which contains radioactive materials with such total radioactivity that after the use of these ionising radiation sources for 10 years it will exceed 100 MBq, before acquiring thereof in the ownership or possession shall take measures to conclude a contract about returning disused source to its manufacturer on the terms as follows:

- 1) the maximum time limit during which the disused source may be returned to its supplier shall be 15 years after concluding the contract,
- 2) the supplier shall undertake to accept back a spent ionising radiation source after the end of the safe usage period thereof within a year after receipt of a written request by the ionising radiation source user.

In case when the purchase and sales contract or the grant agreement does not contain provisions on send-back of disused sealed sources to producers thereof:

- 1) other possible suppliers must be sought or;
- 2) requirement to pay a tax for import of radioactive substances into Latvia is enforced.

Latvia has developed a new Radioactive Waste Management Program according to EU directive and IAEA requirements. Programme is included in Environmental Policy Strategy 2014-2020 and approved by Cabinet of Ministers Order on 10 May 2017. In the Programme following activities are included e.g.:

- long term safety assessment of repository RADONS,
- construction of two new vaults for disposal of radioactive waste in repository RADONS,
- construction of interim storage for long lived radioactive waste in repository RADONS,
- long term safety improvement of existing vaults in repository RADONS,
- decommissioning of Salaspils research reactor,
- self-assessment and international assessment of radiation safety and nuclear safety infrastructure (IRRS mission),
- self-assessment and international assessment of radioactive waste management system (ARTEMIS mission),
- continued development of procedure for radioactive waste characterization and categorization,
- continued improvement of retrieval and management of orphan sources,
- continued promoting of understanding to the general public through means of internet website, educational and informative materials, meetings,
- and arrangement of international training courses on management of radioactive waste, continued regular training in radiation safety as well as training on dealing with emergency situations.

Article 12

Existing facilities and past practices

Centre is the sole organization in Latvia dealing with all stages of radioactive waste management, including processing, conditioning, transportation, long-term storage, and disposal of radioactive waste. Centre maintains near surface radioactive waste repository RADONS in Baldone.

Centre also maintains research reactor site in Salaspils and is dealing with safe enclosure of research reactor and decommissioning activities thereof.

Article 13

Siting of proposed facilities

The required measures are provided by the set of legislation acts, in particular:

- The Law on Radiation Safety and Nuclear safety stating that in accordance with the Law on Environmental Impact Assessment, an environmental impact assessment has been performed for the creation of an ionising radiation object of national significance or the performance of essential changes therein, a decision to accept activities shall be taken by the Cabinet by issuing an order for each time.
- Cabinet Regulations “Procedure for Licensing and Registration of Activities with Ionizing Radiation Sources” No.752 (22.12.2015) requiring to fulfil major steps to be made prior to authorization of the facility, and establishing the mechanism of public hearing;
- The Law on Environmental Impact Assessment governing potential evaluating of relevant site-related factors likely to affect the safety of facility, and prescribing requirements for assessment of impact of proposed facilities on the environment.
- Convention on environmental impact assessment in a transboundary context (so called Espoo Convention) requires cross border activities regarding siting issues.

Article 14

Design and construction of facilities

These provisions have been incorporated in general legislation by the Law on Radiation Safety and Nuclear Safety. The Law on Conformity Assessment, the Law on Environmental Impact Assessment, National Basic Safety Standards and Licensing Regulations must also be complied with.

Cabinet Regulations “Procedures for Building of Facilities Related to Radiation Safety” No.661 (24.11.2015., based on Construction Law) have been implemented for construction of sources of ionising radiation of national level, with requirements for obtaining a building permit, building design, and construction work. These regulations also apply to radioactive waste management facilities.

Article 15

Assessment of safety of facilities

The Cabinet Regulations “Protection against Ionising Radiation” No.149 (09.04.2002) and Cabinet Regulation “Procedures for Licensing and Registration Activities with Sources of Ionising Radiation” No.752 (22.12.2015), require, that in order to be authorized, the following tasks shall be carried out by applicant:

- reduce the risks to the health and safety of an employee or other person, related to the structure and use of a source of ionising radiation, taking into account the effect of the ionising radiation, electric shock and mechanical hazard;
- ensure the preparedness for radiological emergencies and the prevention of the consequences thereof;
- ensure the development of a quality assurance programme;
- ensure access to information concerning the evaluation of potential threat from

facilities, as prescribed by the licensing regulations.

Information about planned activities and major changes at facilities should also be provided to the public. All this information used for RSC decisions regarding licensing, licensing conditions and implementation is also verified when inspections are carried out.

Cabinet Regulations prescribe the duties of RSC in the field of inspections. Internal RSC document “Inspection Manual” was developed in 2004/2005, based on Law on State authorities. This law prescribes that such internal/external documents (in this case - regulatory provisions of RSC) shall be developed to ensure knowledge of operators about working procedures of regulatory authority. This internal document was updated in 2016 and several documented procedures for inspection process were established.

RSC inspectors carry out verification of safety on regular basis and also perform announced and unannounced inspections. Repository RADONS as well as Salaspils Research Reactor are annually inspected by RSC inspectors, different types of inspections are carried out – complex, thematic, follow-up inspections. Supervising of operators is supplemented by goal-oriented inspections (including IAEA and European Commission safeguards inspections, international missions aimed at physical protection modernization in both facilities). Other operators are inspected by RSC taking into account graded approach.

Moreover there is additional legal base for safety impact assessment, which is given in the Law on Environmental Impact Assessment. This system was extensively used during the planning phase of decommissioning of Salaspils research reactor and activities for expansion of radioactive waste repository RADONS.

Cabinet Regulations “Practices Involving Radioactive Waste and Related Materials” No.129 (19.03.2002) define responsibility of operators to perform long-term safety assessment for both types of facilities - the new facilities as well as already existing:

- 1) before establishment of radioactive waste facility;
- 2) before amendments in the licence related to essential changes in operation;
- 3) once in 10 years before submission of licence application for facility operation;
- 4) before closure of radioactive waste disposal facility.

By performing the long-term safety assessment, the operator takes into account all requirements of national legislation as well as IAEA recommendations related to safety assessment. Operator informs the society about safety assessment via their website, local newspaper, electronic report to RSC and local municipality.

Design options of new radioactive waste vault and new long-term storage facility and safety assessment of existing radioactive waste vaults were examined in the process of environmental impact assessment (completed in 2005). The last long-term safety assessment of repository RADONS was performed in 2016. The main objectives of the safety assessment were:

- To characterize and analyse location of repository RADONS;
- To analyse characteristics of disposed radioactive waste as well as radioactive waste kept for long term storage (incl. new vaults and long term storage);
- To analyse design of existing vaults;
- To provide analysis of potential scenarios of spreading radioactive contamination;
- To elaborate proposals for decrease of ionizing radiation in case of exceeded levels stipulated by legislation.

Main conclusions from the report of long-term safety assessment of repository RADONS:

- Present technical and institutional status of repository RADONS ensures safe operation of the storage in accordance with the requirements of normative;
- Existing physical barriers of infrastructure are adequate to ensure long term radiological safety;
- Despite to potential migration capacity of tritium, taking into account existing and planned engineering solutions to be applied after closure of the storage, no significant risks of spread of tritium exist that might create risks for the environment and local inhabitants;
- After operational period of radioactive waste vaults it is necessary to provide complex of engineering for closure of vaults in accordance with requirements of normatives that shall result in construction of multi-layer closure top cover;
- In order to provide adequate monitoring regime for assessment of impact of radioactive waste storage to the environment it is necessary to carry out assessment of existing monitoring system.

From 2015 December till 2016 May a project/research of assessment of data characterizing social-economic development and inhabitant health of Baldone district where is situated repository RADONS was implemented. The aim of the project was to assess the main affecting factors of social-economic development and data characterizing inhabitant state of health during the last twenty years, comparing with average indexes in similar surrounding districts and Latvia.

Article 16

Operation of facilities

- **Licensing procedures**

The licensing procedures for radioactive waste management facility are regulated mainly by set of licensing regulations, which cover the conceptual stage, design, construction, commissioning and operation of the facility. The operation license is valid for a period of 10 years.

The last license issued to the operator of radioactive waste management repository RADONS (in 2012) is based on conclusions obtained from Long-term safety analysis of the Baldone repository and EIA study as well as the EU Twinning Light Project Radioactive Waste Management and Reactor Decommissioning. RSC is assessing compliance to requirements with national legislation and existing standards. All safety related instructions and quality assurance programmes prepared by operator have been analysed and accepted by RSC.

- **Assurance of engineering and technical support**

Radioactive waste management is mainly funded from the State budget, thus assurance of support in safety related fields are considered annually and the Ministry of Environmental Protection and Regional Development can provide extra resources if needed.

External engineering and technical support is provided in the frame of the relevant IAEA Technical Co-operation Projects and by co-operation with USA (Department of Energy) etc.

- **Incident Reporting system**

The provisions required reporting of incidents have been implemented in the Law on

Radiation Safety and Nuclear Safety – operator and job manager is responsible for immediate incident reporting to the RSC and other institutions who are dealing with radiation safety and nuclear safety issues. Fortunately, there has not been such event up to now. The minor deviations from safety requirements are registered by operator and discussed with RSC inspectors during the planned inspections. The corrective actions are always prepared and implemented.

- **Provisions regarding decommissioning of radioactive waste management facilities, closure of a disposal facility**

Provision for future decommissioning plan for any facility where radioactive materials are used is required by Licensing Regulations. When applying for a license an outline for decommissioning plan is required and it has to be updated during entire operational period.

Cabinet Regulations “Practices Involving Radioactive Waste and Related Materials” No.129 (19.03.2002) foresee that before closure of the disposal facility a detailed consecutive implementation of a set of measures with an aim to upgrade safety has to be carried out. The possibilities for implementation of these requirements are subject to licensing conditions.

Article 17

Institutional measures after closure

Provisions related to activities after closure of facility are implemented and in detail specified in Cabinet of Ministers regulations “Practices Involving Radioactive Waste and Related Materials” No.129 (19.03.2002). There are no major changes for these requirements.

Section I

Transboundary movement

Article 27

Transboundary movement

Basic provisions of this Article have been implemented in Cabinet Regulations on Practices Involving Radioactive Waste and Related Materials, No.129 (adopted 19.03.2002). These regulations stipulate that:

- RSC forwards an application for the permit to export radioactive waste and the corresponding Permission Form to the Authority of that state where it is planned to carry out waste reprocessing and to Authorities of all those states whose territories will compose the transportation route of this waste, followed by a relevant request to give a corresponding conclusion;
- RSC is authorized to issue a permit to export radioactive waste for its re-processing only after receipt of official permit from the Authorities of all those states to whom RSC had forwarded the permit to export radioactive waste for the purpose of its reprocessing.

RSC has never issued a permit for transboundary movement of radioactive waste.

Section J

Disused sealed sources

Article 28

Disused sealed sources

According to the Law on Radiation Safety and Nuclear Safety and Cabinet Regulations operator is responsible for safe management of radioactive sources (incl. disused sealed sources). Management of disused sealed sources is prescribed also by the requirements set in regulations on licensing and in Cabinet Regulations on Practices Involving Radioactive Waste and Related Materials, No.129 (adopted 19.03.2002).

Based on these legal provisions and some experiences of practical implementation Latvia has sent a notification to the IAEA about implementation of Code of Conduct and recommendations for transboundary movements.

Proper possession and accounting of disused sealed sources is provided by the requirements of the Law on Radiation Safety and Nuclear Safety, setting up to the RSC following obligations:

- to ensure identification, investigation and assessment of unknown ionising radiation sources discovered on national territory, or of undeclared ionising radiation sources discovered at the state's border, and to organise disposal thereof should it fail to be possible to identify the user or the owner of a radiation source;
- to ensure accounting of ionising radiation sources; to establish and update data bases on radioactive substances, nuclear materials, radioactive waste and other ionising radiation sources.

Practices towards safe disposal of disused sealed sources

Before issuing a licence for practices with sealed sources, the RSC requests information about the planned activities with the disused sealed sources. Sealed sources are mainly used in industry, science institutions and medicine.

The Cabinet of Ministers regulations "Requirements for the Practices with Radioactive Waste and Related Materials" No.129 (adopted 19.03.2002) and Cabinet Regulation "Procedures for Licensing and Registration Activities with Sources of Ionising Radiation" No.752 (22.12.2015) together with the Law on Natural Resource Tax encourage return of disused sources to their producers. If it is not possible, disused sources are disposed or stored in repository RADONS.

In case if orphan source the state is responsible for the safe management of source. Repository RADONS is used for disposal or storage of orphan sources. In Latvia a system has been established to ensure the localization of orphan source. Fixed radiation monitors and portable radiation detectors have been used on the borders and the largest collection points of scrap metal. In case of exceeded ionizing radiation levels RSC takes decision about investigation of this object (etc. organize measurements of radioactivity level). In case of a radioactive source RSC organizes the transportation of this source to the repository RADONS. Centre is responsible for the transportation and management of orphan sources.

Section K

Planned activities to improve safety

Another type of activities related to safety improvements are the construction of a new vault at repository RADONS and an interim storage for long lived waste, and final capping of old vaults. These activities are connected with decommissioning of Salaspils research reactor. All these activities are included in Radioactive Waste Management Programme⁴. In addition other important activities planned till 2020 are:

- improvement of radiation control system and safety, self-assessment and international assessment of radiation safety system (IRSS mission) and radioactive waste management system (ARTEMIS mission) in 2017-2019,
- reducing of radioactive waste (continuing the work of developing procedure for radioactive waste characterizing and categorization),
- promoting of understanding of radioactive waste management (public information, international and regular teachings, emergency trainings, participation in research projects).

⁴ Radioactive Waste Management Program is included in Environmental policy strategy 2014-2020 and approved by Cabinet of Ministers on 10 May 2017.

Section L Annexes

Annex A

Overview Matrix of current practice of Radioactive Waste Management in Latvia

Type of Liability	Long-term management policy	Funding of Liabilities	Current practice / Facilities	Planned facilities
Spent fuel	Not applicable. SNF from research reactor returned to Russian Federation			
Nuclear fuel cycle wastes	Not applicable			
Application wastes	Disposal, centralized treatment, long-time storage for long-lived waste, regional approach for disposal	Users, environmental tax, State budget	Near surface repository RADONS	New repository vault and long term storage for long-lived wastes planned at the existing repository RADONS
Decommissioning	Dismantling ("brown field")	State budget	Minor decommissioning activities	Expansion of the repository RADONS (disposal site)
Disused Sealed Sources	Return to supplier, disposal or storage pending disposal	Users, environmental tax, State budget	Centralized storage or disposal (repository RADONS) if return is impossible	Long-term storage at the repository RADONS (disposal site)

Annex B

Inventory of radioactive waste

List of spent fuel management facilities: None.

List of radioactive waste management facilities: There are two main facilities:

1. Radioactive waste disposal site – near surface radioactive waste repository RADONS;
2. Pre-treatment and conditioning facility at Salaspils site, which has also store for conditioned cemented radioactive waste to be collected before transportation to the disposal site – repository RADONS.

Basic information about facility

Repository RADONS was commissioned in October 1962. The site is located at a hill that rises up to a level of 35 m higher than the territory surrounding it. In the vicinity of the site, the level of groundwater is 18 m below the earth surface. Hence, penetration of groundwater into the near-surface vaults for radioactive waste disposal is minimised. There is a zone with radius of 1 km around the centre of the site where no residential houses are found.

Centre shall ensure also storage of all long-lived radioactive waste until the establishment of a geological repository or finding of other solution. The institutional control after the closure of the repository is foreseen for the period of 300 years.

The repository RADONS covers an area of 7 hectares. A general lay-out of the site is given in Fig.1. The operator-controlled area (i.e. the site) is divided in a controlled area (the B-zone) and a supervised area (the A-zone). The physical boundaries of the premises and buildings are used as a boundary of these areas (zones).

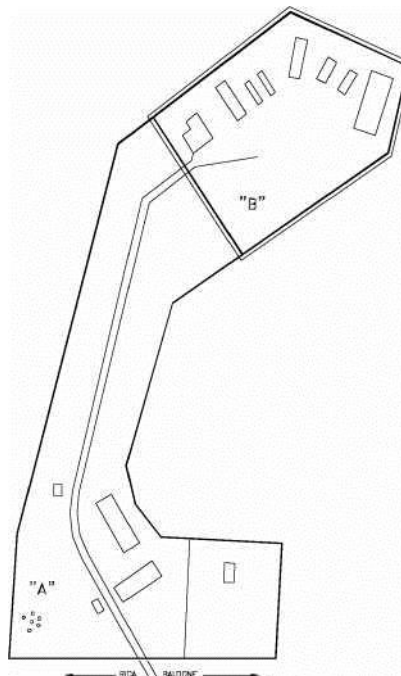


Figure 1 Arrangement of the radioactive waste repository RADONS

- **List of nuclear facilities in the process of being decommissioned:** Salaspils research reactor.
- **Inventory of spent fuel:** Nothing remains at the site.

- **Inventory of radioactive waste:** The total radioactivity of waste accepted for disposal or long-term storage over 40 years of operation of the site, taking into account the radioactive decay, at the end of 2017 is around $3,1 \cdot 10^{14}$ Bq and total volume about 890 m³. The amount of radioactive waste accepted per year varies from one year to another, in the period 2014-2016 fluctuating between 10^9 Bq and 10^{10} Bq. The volume of accepted radioactive waste is low.

The annual accepted radioactive waste volumes and their activities are illustrated in Table 1. Radioactivity for all radionuclides is given in Table 2 (data re-calculated on 1 January 2017).

Table 1

Annual amount of radioactive waste received by repository RADONS

Year	Volume, m ³	Activity, Bq
2000	16	3,50E+12
2001	16	4,80E+12
2002	16	8,50E+13
2003	7	9,50E+12
2004	14	7,00E+13
2005	17	1,20E+12
2006	17	1,40E+13
2007	5	3,20E+13
2008	6,6	1,27E+14
2009	8,5	1,38E+12
2010	7,2	8,04E+06
2011	11,9	4,22E+12
2012	15,3	1,27E+08
2013	0,822	3,87E+10
2014	0,5	7,20E+09
2015	1	2,39E+10
2016	0,6	7,40E+10

Table 2

Radioactive waste inventory at repository RADONS

Nuclide	Interim storage	Vault 1	Vault 2	Vault 3	Vault 4	Vault 5	Vault 6	Vault 7	Total
Ag-108m								6,25E+04	6,25E+04
Ag-110m								6,38E+01	6,38E+01
Al-26				1,05E+12				7,22E+05	1,05E+12
Am-241	1,66E+09		2,22E+03	1,04E+11	2,97E+10		5,31E+11	3,37E+12	4,04E+12
Ba-133	6,23E+05	3,55E+08	1,57E+06	1,45E+11	1,56E+07		3,80E+08	6,25E+06	1,46E+11
Bi-207				5,42E+07			1,35E+08	7,29E+04	1,89E+08
Bi-210m				2,64E+08					2,64E+08
C-14	4,77E+08	4,43E+11	1,86E+09	1,00E+12	2,80E+11	1,23E+08	3,02E+11	2,71E+10	1,85E+12
Cd-109			1,26E+03	1,53E+04	4,61E+02		7,08E+04	5,96E+06	6,05E+06
Cd-113m				4,48E+07					4,48E+07
Cf-252	1,10E+05							1,38E+04	1,24E+05

Cl-36		1,01E+12		4,29E+12	1,22E+08	4,11E+07	2,45E+10		5,32E+12
Cm-244							3,86E+05	6,52E+08	6,52E+08
Co-57	1,37E+05		7,59E+00				1,24E+00	2,72E+03	1,40E+05
Co-60	9,11E+06	5,08E+10	2,49E+05	2,58E+11	2,55E+10	1,65E+07	2,06E+11	1,16E+14	1,17E+14
Cs-134		1,43E+04		1,32E+07	2,92E+04	8,20E+03	4,29E+05		1,37E+07
Cs-137	8,34E+09	2,07E+12	1,58E+08	4,35E+13	1,61E+12	2,21E+07	1,41E+13	2,83E+13	8,96E+13
Eu-152		1,37E+08		3,11E+09			1,17E+10	1,23E+11	1,38E+11
Eu-154		2,03E+07		1,37E+09				2,01E+09	3,40E+09
Eu-155		1,93E+03							1,93E+03
Fe-55	1,17E+04	1,45E+06		1,12E+09	2,53E+07	5,48E+04	1,36E+08	1,74E+10	1,87E+10
Gd-153								6,57E+02	6,57E+02
H-3	4,95E+09	2,16E+10	1,44E+08	8,45E+12	6,01E+09	1,04E+07	2,40E+12	2,70E+13	3,79E+13
I-125	1,69E+02								1,69E+02
K-40		3,70E+10		8,81E+10					1,25E+11
Kr-85		1,09E+09		2,63E+10	6,75E+09		1,70E+10	3,08E+12	3,13E+12
Mo-93				1,83E+07			1,83E+07		3,66E+07
Na-22		1,50E+05		4,18E+08	4,35E+04	1,34E+04	7,12E+05	4,34E+03	4,19E+08
Nd-144		9,96E+07					1,00E+08		2,00E+08
Ni-59				1,80E+09		4,11E+07			1,84E+09
Ni-63	8,30E+08	1,58E+11		9,48E+12			3,41E+10	6,50E+09	9,68E+12
Np-237								1,10E+05	1,10E+05
Pb-210		8,63E+10		5,55E+11	1,31E+07	3,05E+07	5,80E+08	9,62E+06	6,42E+11
Pd-107				5,55E+09			1,82E+09		7,37E+09
Pm-147		2,50E+06		3,37E+09	9,79E+07		1,16E+09	1,68E+10	2,14E+10
Pu-238	4,60E+05			5,54E+09	2,93E+10		2,17E+11	5,59E+12	5,84E+12
Pu-239	1,17E+11	1,85E+11		1,59E+12	8,87E+10	1,85E+09	1,02E+12	2,65E+12	5,65E+12
Ra-226	8,04E+06	8,54E+11	6,05E+09	7,70E+10	3,44E+04	3,65E+07	2,68E+11	3,83E+09	1,21E+12
Rh-102								3,29E+03	3,29E+03
Ru-106				1,66E+02			8,03E+00	1,81E+06	1,81E+06
Sb-125		1,47E+06		7,77E+07			3,15E+05		7,95E+07
Sm-145								2,30E+07	2,30E+07
Sm-151				1,86E+08					1,86E+08
Sn-119m								2,67E+02	2,67E+02
Sn-121m				2,50E+07					2,50E+07
Sr-90	1,76E+05	1,12E+12	4,92E+02	1,98E+12	4,03E+11		1,05E+12	2,19E+13	2,65E+13
Tc-99				1,10E+09	8,98E+07		3,20E+08	1,60E+08	1,67E+09
Th-228					1,85E+00		3,73E+02	4,11E+03	4,48E+03
Th-230				1,67E+04					1,67E+04
Th-232	2,06E+06	4,24E+06	1,18E+09	9,39E+05			1,72E+08	7,60E+08	2,12E+09
Ti-44				1,99E+09			1,05E+08	1,64E+05	2,10E+09
Tl-204		1,02E+08		4,17E+08	2,06E+08		6,32E+09	3,51E+10	4,21E+10
U-232		4,87E+10							4,87E+10
U-233	2,35E+04			3,50E+04	3,84E+04		8,72E+05	1,48E+05	1,12E+06
U-234				2,21E+03			2,15E+04	7,30E+01	2,38E+04
U-235	6,14E+02	6,07E+05		3,57E+04			4,27E+02	1,13E+05	7,57E+05
U-238	2,66E+04	8,22E+07	1,29E+08	2,17E+07	8,00E+06		2,70E+07	6,11E+10	6,14E+10

Zn-65								3,18E+05	3,18E+05
Zr-93		1,78E+07		1,41E+09			2,22E+07		1,45E+09
Total	1,33E+11	6,09E+12	8,47E+09	7,26E+13	2,48E+12	2,17E+09	2,03E+13	2,09E+14	3,10E+14

Radioactivity for all radionuclides re-calculated on 1 January 2017.

Table 3

**Categories of radioactive waste at repository RADONS
(01.01.2017.)**

Category	Volume of disposed waste (m³)	Volume of waste in storage (m³)
Very low level waste (VLLW)	No	No
Low level waste (LLW)	818 m ³ (LLW un ILW) (incl. ~ 26 000 disused sources (ILW))	55 m ³
Intermediate level waste (ILW)		17,5 m ³
High-level waste (HLW)	No	No

Table 4

Radioactive waste radioactivity and amount of ionizing radiation sources in the vaults of repository RADONS

Radioactive waste vault No.	Radioactivity, TBq (01.01.2017.)	Total amount of ionizing radiation sources
1	6,09	2 823
2	0,008	264
3	72,6	9 401
4	2,50	1 361
5	0,002	113
6	20,3	19 072
7	209	58 662
Interim storage facility	0,134	1 594
Total	310	93 290

Annex C

References to Latvian legislation and reports related to safety of radioactive waste

1. References to national laws, regulations, requirements, guides, etc.:

- Law on Radiation Safety and Nuclear Safety, adopted 07.11.2000;
- Civil Defence and Catastrophic Management Law, adopted 05.05.2016;
- Construction Law, adopted 09.07.2013;
- The Cabinet Regulation on the Procedures for Licensing and Registration Activities with Sources of Ionising Radiation, No.752, adopted 22.12.2015;
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