Disclaimer: The English language text below is provided by the Translation and Terminology Centre for information only; it confers no rights and imposes no obligations separate from those conferred or imposed by the legislation formally adopted and published. Only the latter is authentic. The original Latvian text uses masculine pronouns in the singular. The Translation and Terminology Centre uses the principle of gender-neutral language in its English translations. In addition, gender-specific Latvian nouns have been translated as gender-neutral terms, e.g. chairperson.

Republic of Latvia

Cabinet Regulation No. 129 Adopted 19 March 2002

# Requirements for Operations with Radioactive Waste and Materials Related Thereto

Issued pursuant to Section 27, Paragraph three of the Law On Radiation Safety and Nuclear Safety

#### I. General Provisions

- 1. These Regulations determine requirements for operations with radioactive waste and materials related thereto.
- 2. Materials related to radioactive waste are materials, installations and objects which have come into contact with radioactive waste and the total or specific radioactivity of which is less than the limits prescribed by Cabinet Regulations No 288 of 3 July 2001, Regulations on Operations with Sources of Ionising Radiation for which Special Permit (Licence) or Permit is not Required (hereinafter limits prescribed by regulatory enactments for the non-exceeding of which a special permit (licence) or licence is not required).
- 3. An operator whose operations with sources of ionising radiation may produce radioactive waste (hereinafter operator) when planning the operations referred to shall also plan operations with the relevant radioactive waste.
- 4. In conformity with the amount of radioactivity of radioactive waste, radioactive waste shall be classified as follows:
- 4.1. radioactive waste as a result of the radioactive decay of which the total or specific radioactivity is smaller than the limits prescribed by regulatory enactments for the non-exceeding of which a special permit (licence) or permit is not required (hereinafter unusable materials); and
- 4.2. radioactive waste the total or specific radioactivity of which is greater than the limits prescribed by regulatory enactment for the non-exceeding of which a special permit (licence) or permit is not required.
- 5. In conformity with the half-life period radioactive waste shall be classified as follows:



- 5.1. radioactive waste the half-life of which does not exceed 30 days and in which after radionuclide decay no long-lived daughter products are generated (hereinafter short-lived radioactive waste); and
- 5.2. radioactive waste the half-life of which exceeds 30 days or in which after radionuclide decay long-lived daughter products are generated (hereinafter long-lived radioactive waste).
- 6. In conformity with the heat generation rate radioactive waste shall be classified as follows:
- 6.1. radioactive waste the heat generation rate as a result of radioactive decay of which is less than 2 kW per one cubic metre of radioactive waste (hereinafter low and intermediate radioactivity waste); and
- 6.2. radioactive waste the heat generation rate as a result of radioactive decay of which is greater or equal to 2 kW per one cubic metre of radioactive waste (hereinafter high radioactivity waste).
- 7. Materials related to radioactive waste shall be classified in the following groups:
- 7.1. material related to radioactive waste which is removed from State supervision and control in the field of radiation safety and nuclear safety (hereinafter State supervision) because its specific radioactivity is less than the minimum significant specific radioactivity prescribed in Annex 1 of these Regulations and the ionising radiation dose received as a result of the utilisation of such material:
  - 7.1.1. is less than 100 µSv per year for an individual user (for the whole body);
  - 7.1.2. is less than 5 mSv per year for an individual user (for the skin surface);

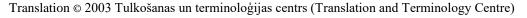
and

- 7.1.3. is less than 1 mSv per year for a collective dose (for the critical group of population); and
- 7.2. material related to radioactive waste the specific radioactivity of which is greater than the minimum significant specific radioactivity prescribed in Annex 1 of these Regulations, but smaller than the limits prescribed by regulatory enactments for the non-exceeding of which a special permit (licence) or permit is not required.

#### II. Requirements for Recording of Radioactive Waste and Materials Related Thereto

- 8. The work supervisor in the operator-controlled area (hereinafter work supervisor of the operator) shall perform recording of radioactive waste and materials related to radioactive waste. The recording referred to shall ensure:
- 8.1. a possibility to select the most suitable management methods for the relevant radioactive waste and materials related thereto; and
  - 8.2. a possibility to make a documentary check of the time and manner by which:
- 8.2.1. radioactive waste arrives at an undertaking (company) which in conformity with the articles of association deals with the disposal and management of radioactive waste (management, treatment, preparation for long-term storage or disposal, storage, long-term storage and disposal of radioactive waste) (hereinafter a radioactive waste disposal or management undertaking);
- 8.2.2. spent sources of ionising radiation are sent back to the manufacturers thereof;

2





- 8.2.3. unusable materials are dispersed in the environment or disposed of together with municipal or hazardous waste; and
  - 8.2.4. materials related to radioactive waste are repeatedly utilised.
- 9. Records of radioactive waste shall include information regarding:
- 9.1. radioactive waste which has been produced while carrying out operations with sources of ionising radiation (quantity (in units by mass and volume), state of aggregation, total and specific radioactivity and radionuclides);
- 9.2. radioactive waste located in the special premises or premises for the collection, treatment, packing and storage of radioactive waste (hereinafter temporary radioactive waste repository);
- 9.3. radioactive waste which has been transferred for disposal and long-term storage, including information included in the labelling of the packaging suited for transportation and disposal of radioactive waste (hereinafter radioactive waste package);
- 9.4. spent sources of ionising radiation sent back to the manufacturer of ionising radiation sources;
  - 9.5. unusable material dispersed in the environment:
    - 9.5.1. main radionuclides;
    - 9.5.2. specific and total radioactivity (Bq/g and Bq);
    - 9.5.3. date of dispersal;
- 9.5.4. results of dispersal control to prove that the permissible amounts of radionuclides to be dispersed in the environment prescribed by regulatory enactments have not been exceeded; and
  - 9.5.5. each dispersed portion and a summary thereof for a year; and
  - 9.6. individual numbers assigned to the radioactive waste packages.
- 10. Records of the materials related to radioactive waste shall include the following information:
  - 10.1. name;
  - 10.2. main radionuclides;
- 10.3. radioactive contamination the specific radioactivity of which radioactive substance on a surface exceeds  $0.4~\mathrm{Bq/cm^2}$  for beta radiation sources, gamma radiation sources and low toxicity alpha radiation sources or  $0.04~\mathrm{Bq/cm^2}$  for other alpha radiation sources if such radioactive substances:
- 10.3.1. cannot be removed from the surface with the usual decontamination methods (hereinafter fixed radioactive contamination); or
- 10.3.2. may be removed from the surface with the usual decontamination methods (hereinafter non-fixed radioactive contamination);
  - 10.4. specific and total radioactivity (Bq/g and Bq);
  - 10.5. types of use; and
- 10.6. institution or undertaking (company) to which the material related to radioactive waste has been transferred for further use and the date of transfer.
- 11. The work supervisor of the operator shall:
- 11.1. each year by 31 January send to the Radiation Safety Centre (hereinafter Centre) the information referred to in Paragraphs 9 and 10 of these Regulations for the previous calendar year; and



- 11.2. each year by 31 December send to the Centre and the radioactive waste disposal and management undertaking an informative letter regarding those operations with sources of ionising radiation, which may cause generation of radioactive waste in the next calendar year.
- 12. The informative letter referred to in Sub-paragraph 11.2 of these Regulations shall specify:
- 12.1. the information regarding the operator, the work supervisor of the operator and the person responsible for radioactive waste;
- 12.2. the amount of the planned radioactive waste, its radioactivity and form radionuclides in the form of open radiation sources or radionuclides in the form of sealed radiation sources;
- 12.3. a list of the measuring instruments utilised in the measurement of the ionising radiation dose rate, measurements of non-fixed and fixed radioactive contamination and determination of the qualitative and quantitative content of radionuclides;
  - 12.4. a description of the temporary radioactive waste repository; and
- 12.5. a description of the planned operations with radioactive waste, including disposal or long-term storage and specifying the measures planned in order to meet the requirements of the radioactive waste management or disposal undertaking.

### III. Requirements for Operations with Radioactive Waste and Materials Related Thereto in Places of Generation Thereof

- 13. The operator shall ensure:
- 13.1. financial, technical and worker resources for safe operations with radioactive waste and materials related thereto;
  - 13.2. minimum total or specific radioactivity and volume of radioactive waste; and
  - 13.3. transfer of radioactive waste for disposal.
- 14. Sorting, treatment and storage of radioactive waste shall be performed by dividing the waste into the following groups:
  - 14.1. gaseous radioactive waste (without applying storage);
  - 14.2. liquid radioactive waste;
  - 14.3. solid radioactive waste;
  - 14.4. spent sealed radiation sources; and
  - 14.5. biological radioactive waste.
- 15. The work supervisor of the operator shall ensure that:
  - 15.1. each radioactive waste container contains radioactive waste of one group only;
  - 15.2. in a radioactive waste container the following are not mixed together:
    - 15.2.1. treated and untreated radioactive waste;
    - 15.2.2. short-lived radioactive waste and long-lived radioactive waste;
    - 15.2.3. low and intermediate radioactivity waste and high radioactivity waste; and
    - 15.2.4. radioactive waste referred to in Sub-paragraph 4.1 and 4.2 of these

#### Regulations;

- 15.3. radioactive waste is treated, transforming it into such chemical and physical form, which is safe and appropriate for storage and transportation of radioactive waste;
  - 15.4. liquid radioactive waste is neutralised;



- 15.5. radioactive waste does not contain explosive or inflammable materials or compressed gases;
- 15.6. radioactive waste which contains rotting or decomposing substances or objects (including food or dead bodies of animals) is treated protecting it from biological decomposition processes or is stored frozen;
- 15.7. radioactive waste containing chemically or biologically hazardous materials and materials which may cause dangerous infectious diseases or in any other manner endanger epidemiological safety is treated maximally reducing those hazardous properties of radioactive waste which are not related to its radioactivity; and
- 15.8. prior to disposal of radioactive waste the necessity to perform additional treatment is as small as possible.
- 16. The operator shall ensure that the radioactive waste container that is utilised in a temporary radioactive waste repository is:
  - 16.1. durable;
  - 16.2. compatible with the radioactive waste placed therein; and
  - 16.3. safely filled and emptied.
- 17. If a radioactive waste container is filled, the work supervisor of the operator shall ensure that the radioactive waste container:
  - 17.1. is labelled with the following information:
    - 17.1.1. the radiation warning sign;
    - 17.1.2. the date on which the radioactive waste container was filled;
    - 17.1.3. the type of radioactive waste generation;
- 17.1.4. a symbol or name of radionuclides and the total and specific radioactivity thereof (Bq and Bq/g), the date of its measurement;
- 17.1.5. the ionising radiation dose rate at the distance of 1 cm and 1 m from the surface;
- 17.1.6. the group of radioactive waste and an indication whether it is short-lived or long-lived radioactive waste and whether it is low and intermediate or high radioactivity waste; and
- 17.1.7. the name, legal address and telephone number of the radioactive waste packing undertaking (company); and
  - 17.2. is without delay conveyed to the temporary radioactive waste repository.
- 18. If it is necessary to store and later transfer for disposal radioactive waste the size of which is greater than the radioactive waste storage containers, the work supervisor of the operator shall ensure crushing of the radioactive waste to the appropriate size.
- 19. Solid radioactive waste shall be accumulated in plastic bags and together with this outer packaging shall be placed:
- 19.1. into a 0.1 m<sup>3</sup> steel drum if the amount of radioactive waste per year does not exceed 1 m<sup>3</sup> and the total or specific radioactivity thereof does not exceed the values specified in Annex 2 of these Regulations;



- 19.2. into special reinforced concrete containers which meet the requirements prescribed by Cabinet Regulation No 307 of 3 July 2001, Regulations on Protection Against Ionising Radiation while Transporting Radioactive Materials in respect of IP-3 or type A packages if:
  - 19.2.1. the amount of radioactive waste per year exceeds 1 m<sup>3</sup>; or
- 19.2.2. the size of radioactive waste is large and it cannot be emplaced into a 0.1 m<sup>3</sup> steel drum.
- 20. Radioactive waste shall be prepared for transportation, labelled and transported in compliance with the requirements prescribed by Cabinet Regulation No 307 of 3 July 2001, Regulations on Protection Against Ionising Radiation while Transporting Radioactive Materials.
- 21. The work supervisor of the operator shall ensure:
  - 21.1. preparation of radioactive waste for transportation and labelling thereof;
- 21.2. examination of a radioactive waste package so that it meets the following requirements:
- 21.2.1. non-fixed radioactive contamination on the external surface of the package for beta radiation sources, gamma radiation sources and low toxicity alpha radiation sources does not exceed 4 Bq/cm<sup>2</sup> per 300 cm<sup>2</sup> of the available surface, but for other alpha radiation sources 0.4 Bq/cm<sup>2</sup> per 300 cm<sup>2</sup> of the available surface; and
- 21.2.2. the ionising radiation dose rate does not exceed the value permissible for the relevant package and 2 mSv/h at any point of the external surface.
- 22. If after elimination of radiation emergency consequences the amount of radioactive waste exceeds three cubic metres, it is permitted to accumulate the waste in 0.1 m<sup>3</sup> steel drums which shall be transported as exceptional packages in conformity with the requirements prescribed by Cabinet Regulation No 307 of 3 July 2001, Regulations on Protection Against Ionising Radiation while Transporting Radioactive Materials. In such case the work supervisor of the operator shall specify in the labelling of the package at least the following:
  - 22.1. the main radionuclides;
- 22.2. the assessed maximum total radioactivity of the radioactive content expressed in the measurement units of the SI system or at least the ionising radiation dose rate on the surface of the drum and at a distance of 1 m, as well as the time of measurement of such values; and
  - 22.3. the category of the package I-white, II-yellow or III-yellow.
- 23. Radioactive waste shall be transported by the specialised transport of the radioactive waste disposal or management undertaking or by a means of transport of the operator (if the operator has an appropriate special permit (licence) or a permit for transportation of radioactive waste) which meets the requirements prescribed by Cabinet Regulation No 401 of 7 December 1999, Regulations on Road Haulage of Dangerous Goods.
- 24. Large quantities of radioactive waste which has been generated when eliminating the consequences of radiation emergencies, if the total and specific radioactivity thereof does not exceed the values specified in Annex 2 of these Regulations, may be conveyed as solid low specific radioactivity waste (except for powder) in LSA-III 0.1 m<sup>3</sup> steel drums which prior to disposal of radioactive waste together with the radioactive waste shall be placed in 0.2 m<sup>3</sup> steel



drums or reinforced concrete containers and the empty space (also beneath and above the 0.1 m<sup>3</sup> steel drum) shall be filled with concrete.

- 25. If the operator has been declared insolvent and cannot manage radioactive waste or prepare it for transfer for disposal or long-term storage, the Centre shall inform the relevant local government of the potential danger to the inhabitants of this local government and together with the operator shall ensure the possibility of transferring for disposal all radioactive waste and sources of ionising radiation which are not required for further operations or whose safety no longer meets the requirements prescribed by regulatory enactments.
- 26. The Centre shall issue a permit to repeatedly utilise materials related to radioactive waste which are not subject to State supervision outside the operator-controlled area.
- 27. Materials related to radioactive waste, which may be repeatedly utilised without additional treatment, shall be removed from State supervision taking into account the radioactive contamination thereof.
- 28. In calculating the maximum permissible fixed and non-fixed radioactive contamination on a surface the values of ionising radiation doses prescribed in Annex 1 of these Regulations or Subparagraph 7.1 of these Regulations shall be used as criteria. These criteria shall refer to the total fixed and non-fixed radioactive contamination.
- 29. When using radioactive contamination on a surface as a criterion, the average level of radioactive contamination shall be determined for 300 cm<sup>2</sup> of the available surface of the material or for the whole surface of the material if it is smaller than 300 cm<sup>2</sup>. The work supervisor of the operator shall ensure that the non-fixed radioactive contamination is as small as possible.
- 30. When using specific radioactivity as a criterion, the average specific radioactivity for each 100 kg of the total mass of radioactive materials or for the whole amount of materials if the total mass of radioactive materials is less than 100 kg shall be determined.

#### IV. Requirements for Storage of Radioactive Waste and Materials Related Thereto

- 31. In conformity with the purpose of radioactive waste storage the following types of storage shall be distinguished:
- 31.1. storage of radioactive waste until the time when due to decay its specific radioactivity has decreased to the minimum significant specific radioactivity and it cannot be subjected to the State supervision (hereinafter storage until decay);
  - 31.2. storage of radioactive waste until its treatment is carried out;
- 31.3. storage of treated radioactive waste prior to shipment to a radioactive waste disposal or management undertaking;
- 31.4. storage of a spent sealed radiation source prior to sending it back to the manufacturer; and
  - 31.5. long-term storage of radioactive waste until:



- 31.5.1. such radioactive waste repository has been created which is situated in geologically stable formations in the depth of at least 100 m from the earth's surface (hereinafter geological repository); or
- 31.5.2. a possibility has been found to send radioactive waste for processing in a solid state in conformity with the packaging chosen in order to be able to safely transport and dispose it (hereinafter processing) outside Latvia.
- 32. In a temporary radioactive waste repository and in an engineering construction located at little depth from the earth's surface or created on the earth's surface (hereinafter near-surface repository) multiple protection barriers shall be utilised to ensure safe storage of radioactive waste.
- 33. For the long-term storage of radioactive waste only a near-surface repository of a radioactive waste management or disposal undertaking may be utilised. As safe storage criteria the following shall be utilised:
- 33.1. the impact of the relevant repository on environmental pollution, taking into account the natural radioactivity level the specific radioactivity of radionuclides in materials and starting materials encountered in the relevant territory on average (with the condition that its amount has not significantly increased after some radiation emergency); and
- 33.2. the effect of long-term stored radioactive waste on a worker who carries out operations with sources of ionising radiation in the relevant repository.
- 34. In storing radioactive waste the following requirements shall be observed:
- 34.1. for each specific group of radioactive waste storage shall be ensured separately from other groups, taking into account also the requirements specified in Sub-paragraph 15.2;
- 34.2. for non-treated radioactive waste temporary storage shall be planned for not longer than a year and during this time radioactive waste shall be treated, packaged and transferred for disposal or long-term storage;
- 34.3. the radioactive waste container, if possible, shall not be moved in the repository until the transfer for disposal or long-term storage;
- 34.4. radioactive waste shall be stored separately from those sources of radioactive radiation which can be utilised for further operations; and
- 34.5. radioactive waste shall be stored in containers, which are suited for the relevant type of storage and are appropriately labelled.
- 35. If it is intended to store a group of radioactive waste until decay, in order to reduce the amount of radioactive waste to be sent for disposal, a special compartment in the temporary radioactive waste repository shall be created which is intended for storage until decay and in which emplacement of other groups of radioactive waste or materials related to radioactive waste is prohibited.
- 36. Storage until decay shall be applied to short-lived radioactive waste, as well as other radioactive waste if the operator ensures that it shall be stored as long as necessary so that after radionuclide decay its radioactivity does not exceed the minimum significant radioactivity.



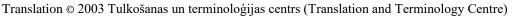
- 37. Materials related to radioactive waste which contain short-lived radioactive waste shall be stored in a temporary radioactive waste repository until its specific radioactivity as a result of radionuclide decay becomes smaller than the minimum significant radioactivity.
- 38. The operator shall ensure that storage until decay does not exceed one year but in separate cases, if it is provided for in the special permit (licence) or permit for operations with sources of ionising radiation, the storage time until radionuclide decay may be five years.
- 39. The compartment which is intended for storage until decay shall provide a possibility to disperse under controlled circumstances the unusable materials generated upon radionuclide decay, taking into account the permissible amounts of radionuclides for dispersal specified in regulatory enactments.
- 40. A temporary radioactive waste repository:
- 40.1. shall be so created that all radioactive waste which may be generated within a year can be stored separately by groups;
- 40.2. shall be provided with protection against unauthorised entry therein and the possibility to ascertain that no unauthorised operations with radioactive waste are carried out;
- 40.3. shall be equipped with installations and materials for protection against ionising radiation:
- 40.4. shall be so created that all surfaces are made of materials, which are easy to decontaminate or are covered with such materials;
- 40.5. shall be provided with air purification systems and exhaust gas monitoring facilities if during storage radioactive gases may be released from radioactive waste or the air in the repository may be polluted with radioactive aerosols; and
- 40.6. shall be so created that all operations are carried out under safe conditions and it is possible to easily transfer radioactive waste containers so as to transport them to a radioactive waste disposal or management undertaking.
- 41. Flammable or combustible radioactive waste shall be stored separately from other radioactive waste, ensuring the fulfilment of the necessary fire-safety requirements and ensuring the processing thereof in a maximally short period of time.
- 42. Liquid radioactive waste shall be stored in hermetically sealed double-containers. The work supervisor of the operator shall ensure that the volume of the outer radioactive waste container is sufficient for safe storage of all liquid radioactive waste if the internal container loses leak-tightness.

### V. Requirements for Dispersal of Unusable Materials and Materials Related to Radioactive Waste in the Environment

- 43. Prior to dispersal of unusable materials or materials related to radioactive materials in the environment the work supervisor of the operator shall:
- 43.1. check whether the chemical and biological properties of unusable materials to be dispersed in the environment allow the application of the dispersal method;



- 43.2. check whether there is the necessary guarantee to prevent the exceeding of the permissible amounts of radionuclides for dispersal (for each portion of dispersal or day and year) prescribed in regulatory enactments regarding protection against ionising radiation;
- 43.3. check whether at the point of dispersal a possibility to dilute the radioactive waste is ensured, so that its total and specific radioactivity does not exceed the permissible amounts of radionuclides for dispersal in the environment prescribed in regulatory enactments;
- 43.4. make calculations to ascertain that the ionising radiation dose limits specified in Sub-paragraph 7.1 of these Regulations are not exceeded; and
  - 43.5. inform the Centre:
- 43.5.1. every year by 15 December regarding the planned dispersal of radioactive waste in the environment during the next calendar year; and
- 43.5.2. at regular intervals but not less than four times a year (by 15 April, 15 July, 15 October and 15 January) regarding the dispersal operations carried out in the previous quarter.
- 44. When releasing liquid unusable materials into the sewerage system together with household waste water, the work supervisor of the operator shall ensure that:
- 44.1. at the waste water discharge site in the sewerage system they are diluted, reducing the concentration at least 10 times;
  - 44.2. water solutions do not contain insoluble admixtures;
  - 44.3. pH of the unusable materials is neutral; and
- 44.4. unusable materials are released only at one specially equipped site in which before and after their discharge water flows from the water main for at least one minute with a normal average flow.
- 45. Solid unusable materials or materials related to radioactive waste may be disposed of in a municipal or hazardous waste landfill site or dump if:
  - 45.1. they do not contain explosive, inflammable materials and compressed gases;
- 45.2. there is no non-fixed radioactive contamination on the surface of the unusable material packaging but the fixed radioactive contamination does not exceed 0.4 Bq/cm² for beta radiation sources, gamma radiation sources and low toxicity alpha radiation sources or 0.04 Bq/cm² for other alpha radiation sources; and
- 45.3. they do not contain a sealed radiation source.
- 46. When dispersing gaseous unusable materials in the atmosphere the work supervisor of the operator shall ensure that:
- 46.1. the ventilation power disperses them reducing the concentration at least 10 times; and
- 46.2. all unusable materials are released into the atmosphere at one specially equipped site only.
- 47. If regulatory enactments do not specify radionuclide dispersal amounts for any of the radionuclides, the work supervisor of the operator shall prepare a temporary calculation of dispersal amounts, utilising the following conditions:
- 47.1. the maximum ionising radiation dose for the critical group of the population (the population who are exposed to the effect of a source of ionising radiation at a similar level and to





10

whom the exposure from such source is the greatest) may not exceed 100  $\mu$ Sv per year but the maximum average ionising radiation dose — 10  $\mu$ Sv per year. These values shall be utilised in calculating the dispersal limits for one solid unusable material portion or one day;

- 47.2. the specific radioactivity is equal to the radioactivity for which the special permit (licence) or permit for operations with sources of ionising radiation is required or smaller than that:
- 47.3. radionuclides get into the organism of an adult by intake thereof with water (liquid radioactive waste), food (solid radioactive waste) or by inhalation (gaseous radioactive waste); and
- 47.4. in numerical calculations of ionising radiation doses coefficients specified in regulatory enactments regarding protection against ionising radiation shall be used.
- 48. The operator shall co-ordinate the temporary dispersal amounts for radionuclides with the Centre. The Centre may permit to carry out separate operations, applying the calculated temporary dispersal amounts if the time of performance of the operations does not exceed three months.

### VI. Requirements for Processing of Radioactive Waste

- 49. The operator in the operator's controlled area may create a radioactive waste processing site and carry out the processing thereof or, if such is provided for in the contract, transfer for processing to the radioactive waste disposal or management undertaking unprocessed radioactive waste.
- 50. When processing radioactive waste the requirements put forward by all the following operations shall be observed in each operation and the necessity to carry out additional treatment or processing of the previously processed radioactive waste at the radioactive waste disposal or management undertaking shall be prevented.
- 51. The operator of the radioactive waste disposal or management undertaking shall receive from the operator information regarding physical and chemical properties of the radioactive waste, the amount in units by mass or volume and the total or specific radioactivity.
- 52. The processor of radioactive waste shall be responsible for the use of appropriate processing technology and shall ensure that the external surface of the radioactive waste container is not contaminated with radioactive substances and the ionising radiation dose rate on the external surface of the package does not exceed the permissible limit.
- 53. When processing radioactive waste the work supervisor of the radioactive waste processor shall ensure that the level of specific radioactivity in each radioactive waste package (except for the package of a spent sealed source of radiation) is as even as possible, avoiding high specific radioactivity in any separate part of the package.
- 54. When processing radioactive waste such processing methods shall be selected that:



- 54.1. the obtained radioactive waste package is structurally stable and all radioactive materials in the package are in a chemically and mechanically stable monolithic form which restricts the spread of radioactive substances outside the radioactive waste package;
  - 54.2. the radioactive waste package has as far as possible no empty spaces;
- 54.3. the radioactive waste package is not damaged within the range of the ambient temperature from -40°C to +55 °C; and
- 54.4. the radioactive waste package endures a pressure of 0.35 MPa and the vertical deformations after such check do not exceed 3%.
- 55. Solid radioactive waste in conformity with its total radioactivity, mass and dimensions shall be processed in the following manner:
- 55.1. it shall be packaged in a 0.1 m<sup>3</sup> steel drum which shall be emplaced in the middle of a 0.2 m<sup>3</sup> steel drum and the empty space among the radioactive waste shall be filled with concrete, ensuring that the whole empty space between the 0.1 m<sup>3</sup> and 0.2 m<sup>3</sup> steel drum (also beneath and above the 0.1 m<sup>3</sup> drum) is filled with concrete;
- 55.2. it shall be emplaced in a 0.2 m<sup>3</sup> steel drum and the empty space between the radioactive waste shall be filled with concrete, ensuring that the whole empty space between the drum and radioactive waste (also beneath and above the radioactive waste) is filled with concrete:
- 55.3. it shall be packaged in a 0.1 m<sup>3</sup> steel drum which shall be emplaced into special sockets in a reinforced concrete container; or
- 55.4. it shall be emplaced in a reinforced concrete container and the empty space among the radioactive waste shall be filled with concrete, ensuring that the whole empty space between the container and radioactive waste (also beneath and above the radioactive waste) is filled with concrete.
- 56. If the total radioactivity of radioactive waste is so great that concrete does not ensure the possibility of observing the permissible limits for ionising radiation dose rate on the package surface, additional protection layers shall be created which attenuate ionising radiation more effectively than concrete.
- 57. Liquid radioactive waste subsequent to its cementation shall be filled in a 0.2 m<sup>3</sup> steel drum. Cementation of liquid radioactive waste directly in the steel drum may be utilised as an alternative method if there is appropriate technical capacity for the performance of such work.
- 58. If ion exchange resins have been used for purification of liquid radioactive waste, such resins shall be processed utilising the cementation method and shall be filled into a 0.2 m<sup>3</sup> steel drum. Cementation of waste directly in the steel drum may be utilised as an alternative method if there is appropriate technical capacity for the performance of such work.
- 59. Organic liquid radioactive waste shall be processed into inorganic liquid radioactive waste, taking into account its radioactive, chemical, physical and toxic properties.
- 60. Organic liquid radioactive waste in small amounts may be added to liquid inorganic radioactive waste if it is experimentally proven that the cement matrix that has formed is



sufficiently stable. In such case the cemented radioactive waste shall be filled into a 0.1 m<sup>3</sup> steel drum which shall be emplaced in a special socket in a reinforced concrete container.

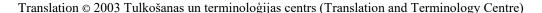
- 61. Spent sealed gamma radiation sources in conformity with their total radioactivity, number and dimensions:
- 61.1. shall be emplaced into a lead container, in exceptional cases in an industrial container where these sources of ionising radiation were located during their use, ensuring in addition that all openings and ducts of this container are made airtight with melted lead. Thereafter the container shall be emplaced in the middle of a 0.2 m<sup>3</sup> steel drum and the empty space between the container and the drum (also beneath and above the container) shall be filled with concrete;
- 61.2. shall be packaged in a stainless steel container which shall be filled with lead pellets and emplaced into a special socket in a reinforced concrete container; or
- 61.3. shall be packaged in a stainless steel container which shall be filled with lead pellets, placed into the middle of a 0.2 m<sup>3</sup> steel drum and the empty space (also beneath and above the container) shall be filled with concrete.
- 62. Spent sealed sources of beta radiation in conformity with their total radioactivity, number and dimensions:
- 62.1. shall be emplaced into a stainless steal or plastic container, in exceptional cases in special plastic bags, ensuring that the spent sealed sources of radiation are packaged in at least three bags. Thereafter the radioactive container or plastic bags shall be emplaced into a 0.2 m<sup>3</sup> steel drum and the empty space shall be filled with concrete, ensuring that the whole empty space between the plastic bag or container and the drum (also beneath and above the bag or container) is filled with concrete; or
- 62.2. shall be packaged in a stainless steel container, which shall be filled with heated quartz sand and shall be placed in a special socket in a reinforced concrete container.
- 63. Spent sealed radium containing radiation sources shall be emplaced into a copper ampoule, which shall be hermetically sealed. The copper ampoule shall be emplaced into a stainless steel ampoule, which shall be welded. In exceptional cases the stainless steel ampoule may only be hermetically screwed. If no organic materials are utilised for sealing of the stainless steel ampoule, its dimensions and thickness shall be sufficient to endure, without damage, the gas pressure generated as a result of the radioactive decay of radium. The sealed stainless steel ampoule shall be emplaced into a lead container which shall be emplaced into the middle of a 0.2 m<sup>3</sup> steel drum and the empty space between the container and the drum (also beneath and above the lead container) shall be filled with concrete.
- 64. Spent sealed neutron radiation sources shall be emplaced into a stainless steel ampoule, which shall be welded. In exceptional cases the ampoule may only be hermetically screwed. If no organic materials are utilised for sealing of the stainless steel ampoule, its dimensions and thickness shall be sufficient to endure, without damage, the gas pressure generated as a result of the radioactive decay. The sealed stainless steel ampoule shall be emplaced into a lead container which shall be emplaced into the middle of a 0.2 m<sup>3</sup> steel drum and the empty space between the container and the drum (also beneath and above the lead container) shall be filled with concrete.



- 65. Spent sealed alpha radiation sources, which do not contain radium, in conformity with their total radioactivity shall be packaged:
- 65.1. into a stainless steel container which shall be filled with heated quartz sand and shall be emplaced into special sockets in a reinforced concrete container; or
- 65.2. in a stainless steel or plastic container. In exceptional cases (if the total radioactivity of the sources after the end of the State supervision period has decreased as a result of the radioactive decay of radionuclides to the limits for the non-exceeding of which no special permit (licence) or permit is required) the spent sealed radiation source may be packaged into at least three special plastic bags which shall be emplaced into the middle of a 0.2 m³ steel drum and the empty space between the bag or container and the drum (also beneath and above the bag or container) shall be filled with concrete.
- 66. Radioactive waste, which contains ion exchange resins, shall be processed so that the absorbed and adsorbed radioactive substances are stabilised in the processed radioactive waste by means of the cementation method. If the operator carries out the processing of radioactive waste, the relevant cementation technology shall be co-ordinated with the operator of the radioactive waste disposal or management undertaking.

### VII. Requirements for Near-Surface Repository and Geological Repository of Radioactive Waste

- 67. When selecting a location for a near-surface repository or geological repository (hereinafter disposal site) the following criteria shall be taken into account:
- 67.1. the climate and the annual amount of precipitation (average values, maximum and minimum observed values);
  - 67.2. the economic activity to be performed in the surrounding territory;
  - 67.3. the density of population;
- 67.4. the ability of the environment to absorb the impact caused by planned operations with radioactive waste without negative changes;
  - 67.5. mineral resources:
  - 67.6. hydrology of surface water and ground water;
  - 67.7. seismic activities and karst formations;
  - 67.8. potential possibilities for the industrial development; and
  - 67.9. the proximity of other countries.
- 68. Within the controlled area of the radioactive waste disposal or management undertaking (within a territory around the disposal site where the received ionising radiation dose may reach 20 mSv per year) there shall be:
- 68.1. a part of the disposal site where it is possible to dispose packaged radioactive waste (hereinafter radioactive waste vault);
- 68.2. long-lived radioactive waste storage vault or a room where radioactive waste may be permanently stored until the transfer thereof for disposal in the geological repository;
- 68.3. a temporary radioactive waste repository for short-term storage of spent sealed radiation sources;
- 68.4. a temporary radioactive waste repository where radioactive waste shall be stored until their treatment, processing and preparation for disposal;





- 68.5. decontamination site or room; and
- 68.6. a room for storage of working materials and equipment.
- 69. Within the supervision area of the radioactive waste disposal or management undertaking (within a territory outside the controlled area where there is a possibility that the received effective dose may exceed 1 mSv) there shall be:
  - 69.1. a security centre;
  - 69.2. a parking place for means of transport;
  - 69.3. an administrative building, a maintenance building and a laboratory;
  - 69.4. a warehouse for materials, objects and spare parts;
  - 69.5. a water supply system (including a pump station and water treatment plants);
  - 69.6. a site for washing of means of transport;
  - 69.7. an access road connecting the supervision area with the controlled area;
  - 69.8. a municipal sewage water treatment system; and
  - 69.9. a boiler house and electric power supply system.
- 70. A near-surface repository shall consist of several radioactive waste vaults, which shall be made of reinforced concrete, and whose minimum volume for disposal of radioactive waste shall be 100 m<sup>3</sup> and which may be divided into separate compartments.
- 71. When planning and creating radioactive waste vaults at a radioactive waste disposal or management undertaking the operator shall ensure that the contact of radioactive waste vaults with ground waters is prevented and a precipitation collection system is developed to drain them from the disposal site and ensure a possibility to control radioactive pollution in these waters.
- 72. The minimum wall thickness of radioactive waste vaults shall be 40 cm unless a thicker physical barrier layer is required in conformity with the long-term safety assessment. In assessing the necessary thickness of the physical barrier, both the natural physical barriers (including surrounding soil and ground layers) and the engineering structures which prevent or hinder the potential migration of radioactive waste from its disposal site shall be taken into account.
- 73. Radioactive waste to which storage until decay may be applied shall not be disposed of in a near-surface repository but long-lived radioactive waste may be stored therein until it is possible to dispose them in a geological repository.
- 74. In a near-surface repository the following shall be disposed of:
- 74.1. radioactive waste which does not contain isotopes with a half-life longer than 30 years;
- 74.2. radioactive waste whose total radioactivity is smaller than the values specified in Annex 3 to these Regulations;
- 74.3. low and intermediate radioactivity waste which contains only such radionuclides whose total or specific radioactivity after the time period during which the control in the radiation safety and nuclear safety area is performed and radiation monitoring programmes are implemented in order to ascertain that the radioactive waste does not endanger the environment, workers carrying out operations with radioactive waste and the population (hereinafter State





supervision period), as a result of their decay will have decreased to the limits specified in regulatory enactments for the non-exceeding of which no special permit (licence) or permit is required; and

- 74.4. radioactive waste containing radionuclides whose total and specific radioactivity after the end of the State supervision period as a result of their decay exceeds the limits specified in regulatory enactments for the non-exceeding of which no special permit (licence) or permit is required if the long-term safety assessment proves that after an additional physical barrier has been created and the empty spaces in the radioactive waste vault between radioactive waste packages are filled with concrete, the potential ionising radiation dose caused by radioactive waste does not exceed 30  $\mu$ Sv per year.
- 75. In a geological repository the following shall be disposed of:
  - 75.1. radioactive waste containing isotopes with a half-life longer than 30 years;
- 75.2. radioactive waste whose total radioactivity is greater than the values specified in Annex 3 of these Regulations;
- 75.3. low and intermediate radioactivity waste which contains radionuclides whose total or specific radioactivity after the end of the State supervision period is greater than the limits specified in regulatory enactments for the non-exceeding of which no special permit (licence) or permit is required; and
  - 75.4. high radioactivity waste.
- 76. For a near-surface repository the State supervision period shall include the supervision of the near-surface repository until the moment when the acceptance of radioactive waste in the radioactive waste disposal or management undertaking is fully terminated (the undertaking is closed down) and 300 years after its closure.
- 77. The maximum permissible total radioactivity of radioactive waste in a package and in a radioactive waste vault, when disposing thereof in a near-surface repository, is prescribed in Annex 3 of these Regulations. In determining the maximum radioactivity for radioactive waste packages, safe transportation of radioactive waste shall be ensured and one of the following conditions shall be observed:
- 77.1. after the end of the State supervision period the radioactivity of radionuclides due to their decay will have decreased to the limits specified in regulatory enactments for the non-exceeding of which no special permit (licence) or permit is required; or
- 77.2. the limit specified in Annex 3 of these Regulations for a specific radionuclide may be exceeded if by means of the long-term safety assessment it is possible to substantiate that the foreseeable ionising radiation dose created by radioactive waste shall not exceed 300  $\mu$ Sv per year.

### VIII. Requirements for Acceptance of Radioactive Waste for Disposal or Long-term Storage

#### 78. The operator shall:

78.1. be responsible for radioactive waste until the moment when it is placed in the specialised means of transport of the radioactive waste disposal or management undertaking or are accepted for storage if a means of transport of another undertaking is utilised; and

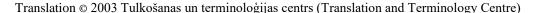


- 78.2. provide the radioactive waste disposal or management undertaking with all the necessary information (including the radioactive waste container and radioactive waste treatment and processing quality control documents regarding radioactive waste) and provide a possibility to become acquainted with administrative, radiation safety, nuclear safety and technical capacity for the transfer of radioactive waste for disposal within the operator-controlled area on site.
- 79. The work supervisor of the radioactive waste disposal or management undertaking or another person working in the radiation safety and nuclear safety division of this undertaking upon acceptance of the radioactive waste from the operator shall check:
- 79.1. the ionising radiation dose rate at a distance of 1 cm and 1 m from the surface of the packaging; and
  - 79.2. the radioactive contamination of the package on the surface thereof.
- 80. If it has been co-ordinated with the radioactive waste disposal or management undertaking, the maximum permissible ionising radiation dose rate on the external surface of the radioactive waste package may be 10 mSv/h but the maximum transport index may not exceed 10.
- 81. When accepting radioactive waste for disposal or long-term storage, the work supervisor of the radioactive waste disposal or management undertaking shall verify:
- 81.1. whether the dimensions and mass of the radioactive waste package, as well as auxiliary devices utilised for lifting and moving of such package conform to the requirements specified by the radioactive waste disposal or management undertaking;
- 81.2. the information provided by the operator regarding radioactive waste in each radioactive waste package with respect to the following:
- 81.2.1. the compliance of the technology utilised for treatment and processing with these Regulations; and
  - 81.2.2. the compliance with disposal or long-term storage requirements; and
- 81.3. whether the deed of acceptance and delivery of radioactive waste specifies sufficient information regarding the radioactive waste (also regarding all radionuclides, their specific and total radioactivity), its treatment and processing, as well as regarding the packaging of the radioactive waste.
- 82. Safety of reinforced concrete containers shall be assessed by determining the tritium and 137Cs diffusion speed through a sample of concrete utilised in manufacturing of the radioactive waste containers the diameter of which sample shall be 7 cm and the thickness 1 cm (for tritium) and 0.5 cm (for caesium).
- 83. Radioactive waste, which contains chemically or biologically hazardous materials, and materials, which may cause dangerous infectious diseases or in any other way endanger the epidemiological safety in the radioactive waste disposal or management undertaking shall not be accepted for disposal.
- 84. Radioactive waste which contains radionuclides with a half-life less than 50 days shall not be accepted for disposal if as a result of their decay no long-lived daughter products are produced.



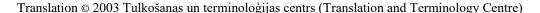
### IX. Requirements for Long-term Safety Assessment of Disposed Radioactive Waste

- 85. Long-term safety assessment for radioactive waste disposal in a near-surface repository shall be performed by analysing a 1000-year period, but in a geological repository at least a 10 000-year period.
- 86. If there are no special considerations in respect of additional factors, which may affect the migration of radionuclides, the following radioactive substance pathways shall be analysed in the long-term safety assessment:
  - 86.1. discharges from radioactive waste vaults into the ground layer;
  - 86.2. migration through the ground layer to:
    - 86.2.1. open water basins; and
    - 86.2.2. ground water layers utilised for drinking water intake; and
  - 86.3. utilisation of water:
    - 86.3.1. for watering;
    - 86.3.2. for human consumption (drinking water); and
    - 86.3.3. for watering of domestic animals.
- 87. For radiation emergency cases additional pathways shall be assessed (including the production of radioactive material dust in explosions resulting from a subversive activity or a plane crash) and the probability of such possible emergency and its impact on the safety of radioactive waste storage shall be analysed.
- 88. In performing the long-term safety assessment of geological repositories the following hypothetical earthquake parameters shall be utilised:
  - 88.1. the maximum magnitude 5.4 on the Richter scale;
  - 88.2. earthquake probability once in 400 years;
  - 88.3. horizontal acceleration 2.4 m/s<sup>2</sup>;
  - 88.4. vertical acceleration  $1.2 \text{ m/s}^2$ ; and
  - 88.5. vertical movement 2.0 cm.
- 89. If on the basis of the long-term safety assessment it is determined that the foreseeable ionising radiation dose for the population who live in the immediate proximity of the radioactive waste management or disposal undertaking is:
- 89.1. 100 mSv per year or greater, measures shall be obligatorily taken to reduce the ionising radiation dose to approximately 300 μSv per year;
- 89.2. from 10 to 100 mSv per year, measures shall be taken within the next five years to reduce the ionising radiation dose to approximately 300  $\mu$ Sv per year; and
- 89.3. 10 mSv per year or smaller, taking of intervention measures shall be evaluated in conformity with the financial and technical possibilities.
- 90. If on the basis of the environmental radiation monitoring results it is determined that the foreseeable ionising radiation dose for the population who live in the immediate proximity of the radioactive waste management or disposal undertaking is:
- 90.1. 5 mSv per year or greater, measures shall be obligatorily taken to reduce the ionising radiation dose to approximately 300 µSv per year;





- 90.2. from 1 to 5 mSv per year, measures shall be taken within the next five years to reduce the ionising radiation dose to approximately 300 µSv per year; and
- 90.3. 1 mSv per year or smaller, taking of the necessary measures shall be evaluated in conformity with the financial and technical possibilities.
- 91. In the long-term safety assessment at least three following events shall be utilised which pose a danger to people and the environment:
  - 91.1. transfer of radionuclides by water;
  - 91.2. direct exposure; and
- 91.3. destruction of the radioactive waste vault and transfer of radionuclides by air (when constructing a road over the disposal site).
- 92. In analysing the possible transfer of radionuclides by water, the following assumptions shall be utilised:
- 92.1. complete degradation of the hydro-isolating layer takes place on the fiftieth year after the end of the State supervision period (350th year after the closure of a near-surface repository), hence the filtration speed through the hydro-isolating layer equals to the average speed in the ground layers of the relevant territory;
- 92.2. for the time period until the 350th year it shall be assumed that the water filtration speed through the hydro-isolating layers is 1% of the average filtration speed in the relevant ground layers;
- 92.3. walls of steel drums shall not be considered a barrier layer or it shall be assumed that the corrosion speed is 3  $\mu$ m per year;
- 92.4. the foreseeable ionising radiation dose shall be calculated for a hypothetical group of the population living at a distance of 1000 m from the disposal site; and
- 92.5. migration of radionuclides from a radioactive waste vault to ground waters and further transfer of radionuclides to the human organism by water if water is utilised as drinking water, for watering of gardens and for watering of domestic animals. Thereafter the other radioactive substance pathway shall be analysed by dust generated by the soil polluted as a result of the watering of gardens.
- 93. In assessing direct exposure, the following main assumptions shall be utilised:
- 93.1. at the end of the State supervision period (300 years after the closure of the near-surface repository) an inhabitant builds a single family house directly on the reinforced concrete cover above a radioactive waste vault (the upper layer of soil has been removed);
- 93.2. an inhabitant stays in the house 6575 hours per year, outside the house -2192 hours per year;
- 93.3. water for drinking and individual farming is obtained from the closest (in respect of the radioactive waste vault) ground water layer; and
  - 93.4. the floor of the building is located three meters above the radioactive waste layer.
- 94. In assessing road construction, the following main assumptions shall be utilised:
- 94.1. operations take place after the end of the State supervision period (300 years after the closure of a near-surface repository);
- 94.2. road construction works are carried out with the average speed of 10 km per six months;





- 94.3. work is carried out eight hours per day 20 days per month;
- 94.4. radioactive waste vaults are partly or fully destroyed because the intervention depth is six meters:
  - 94.5. dust is directly inhaled; and
  - 94.6. radioactive dust together with food from hands is transferred to the organism.
- 95. Operations and events which pose a danger to people and the environment during the operational and State supervision period and which are utilised in the safety assessment shall be the following:
- 95.1. a radiation emergency during performance of technological operations with radioactive waste packages;
- 95.2. an emergency during performance of technological operations in relation with labelling, concreting and dismantling of buildings;
  - 95.3. a plane crash that partly or fully damages the cover of radioactive waste vaults;
- 95.4. an explosion (caused by subversive activity) which partly or fully damages the cover of radioactive waste vaults;
- 95.5. seismic activities (including karst formations) which may partly damage the cover of radioactive waste vaults:
- 95.6. roots of plants and trees and other biological effect which reduces hydro-isolation of the cover of radioactive waste vaults; and
  - 95.7. precipitation.
- 96. Operations and events which pose a danger to people and the environment after the end of the State supervision period and which are utilised in the long-term safety assessment shall be the following:
  - 96.1. road construction; and
  - 96.2. building construction;
  - 96.3. a plane crash that partly damages the cover of radioactive waste vaults;
- 96.4. seismic activity (including karst formations) which may partly damage the cover of radioactive waste vaults:
- 96.5. roots of plants and trees and other biological effect which reduces hydro-isolation of the cover of radioactive waste vaults; and
  - 96.6. precipitation.

# X. Requirements for Radioactive Waste Management After Closure of Radioactive Waste Vault And Termination of Disposal Site Operation

- 97. After the filling of near-surface radioactive waste vaults with radioactive waste packages preservation of radioactive waste shall be performed. Preservation of radioactive waste has the following stages:
- 97.1. the first stage shall commence before covering of vaults with a ground layer and shall end 30 years after creation of the vault protection layer and stabilisation of the ground layer. The principal measures:
- 97.1.1. physical protection of the territory shall be ensured, utilising also guard patrols directly around the radioactive waste vaults;



- 97.1.2. a supervision territory around the radioactive waste management or disposal undertaking shall be determined;
  - 97.1.3. environmental radiation monitoring shall be ensured;
- 97.1.4. radionuclide radioactivity measurements of ground water and drainage water, as well as other examinations shall be performed to ascertain that there is no radionuclide leakage from radioactive waste vaults; and
  - 97.1.5. ground water control wells and other systems shall be maintained in order;
- 97.2. the second stage shall commence 30 years after the creation of the radioactive waste vault protection layer and stabilisation of the ground layer and shall end 260 years thereafter. The principal measures the measures referred to in Clauses 97.1.1, 97.1.2, 97.1.3 and 97.1.4 of these Regulations; and
- 97.3. the third stage shall commence 260 years after the creation of a radioactive waste vault protection layer and stabilisation of the ground layer and shall last until the end of the State supervision period. The principal measures the measures referred to in Clauses 97.1.1 and 97.1.3 of these Regulations, as well as imposing of a prohibition on earth excavation works and other operations which may affect the safety of the radioactive waste vaults.
- 98. Prior to the closure of a radioactive waste vault the empty spaces in the radioactive waste vault shall be filled:
- 98.1. with concrete if at the end of the State supervision period in the near-surface repository there are radioactive waste packages in which the specific radioactivity of radionuclides exceeds the limits prescribed in regulatory enactments for the non-exceeding of which no special permit (licence) or permit is required, and in the whole radioactive waste vault the average specific radioactivity is smaller than the relevant limits; or
- 98.2. with sand if at the end of the State supervision period in the near-surface repository in all radioactive waste packages the specific radioactivity of radioactive waste as a result of radionuclide decay is less than the relevant limits and placing the relevant additional layers specified in Paragraph 99 of these Regulations above it, except for the case when the liquidation concept provides for dismantling of radioactive waste vaults and transfer of the radioactive waste packages and disposal thereof in municipal waste disposal sites.
- 99. In order to ensure that the amount of atmospheric precipitation, which reaches the radioactive waste vault, does not exceed 1.5 litres per 1 m<sup>2</sup> per year and that there is minimum human interference possible, after closure of the radioactive waste vault a multiple protection system shall be created:
- 99.1. above the radioactive waste vault at least 1 m thick monolith reinforced concrete layer shall be created with a slope at the sides of the radioactive waste vault to prevent accumulation of water above the radioactive waste vault;
- 99.2. above the reinforced concrete layer a multi-layer hydro-isolating cover shall be created;
- 99.3. to prevent damage of hydro-isolating cover at least 1 m thick gravel layer shall be spread on top of it;
- 99.4. above the gravel layer a 50 cm thick clay protection layer shall be created in addition;
- 99.5. above the clay layer at least 1 m thick crushed stone layer shall be created to protect the radioactive waste vault against human intervention; and



- 99.6. a 2 m thick soil layer shall be created last.
- 100. The layer covering the radioactive waste vault shall have the following technical requirements:
- 100.1. rain water filtration through the layer to the reinforced concrete layer covering the radioactive waste vault shall be reduced to the minimum;
- 100.2. the covering layer shall retain its properties unchangeable under all weather conditions possible in the relevant territory. In assessment the maximum parameters observed during the last 100 years shall be utilised; and
- 100.3. the covering layer shall endure freezing and thawing cycles, biological effect (also the effect of the tree root system growing above the radioactive waste vaults) after the end of the State supervision period until the moment when the total and specific radioactivity in all radioactive waste packages will have decreased to the limits prescribed by regulatory enactments for the non-exceeding of which no special permit (licence) or permit is required.
- 101. After closure of a radioactive waste vault a labelling in the reinforced concrete layer shall be made which shall warn of the disposed radioactive waste. In making the labelling of radioactive waste vaults the following requirements shall be met:
- 101.1. the labelling shall be made directly in the reinforced concrete layer, utilising stone squares in a contrast colour;
- 101.2. the labelling shall contain an inscription "RADIOAKTĪVIE ATKRITUMI" [radioactive waste] and the internationally accepted radiation symbol;
  - 101.3. the inscription shall be clearly legible, the radiation symbol unambiguous;
- 101.4. the inscription shall be made in four languages Latvian, English, German and Russian; and
- 101.5. the year when the relevant vault was sealed shall be specified below the inscription (using both Arabic and Roman numerals).
- 102. When levelling off the disposal site, additional markers shall be placed beneath the ground which shall have the labelling hollowed out and each side of the triangular pyramid shall bear an inscription "RADIOAKTĪVIE ATKRITUMI" [radioactive waste] in Latvian and in one of the foreign languages specified in Sub-paragraph 101.4 of these Regulations and the base the radiation symbol. The additional markers shall be placed as follows:
- 102.1. in the depth of 1 m from the ground surface a marker in the form of a triangular pyramid shall be placed, the linear dimensions of which shall be 0.5 m. The distance between such markers shall be approximately 5 m; and
- 102.2. in the depth of 0.3 m from the ground surface markers whose linear dimensions are 0.2 m shall be placed. The distance between such markers shall be approximately 2.5 m.
- 103. Before the end of the State supervision period a concrete pyramid shall be placed above the ground layer which covers the radioactive waste vault, in each corner and in the middle of the vault on which there shall be the labelling specifying the information referred to in Paragraph 101 of these Regulations and the number of the radioactive waste vault in conformity with the record information.



- 104. After the closure of a radioactive waste disposal or management undertaking the work performance schedule shall be the following:
- 104.1. during the time period until the 285th year after closure of the radioactive waste disposal or management undertaking, environmental radiation monitoring, repair of radioactive waste packages and packaging of radioactive waste packages in outer additional packages shall be performed if such is necessary, as well as physical protection shall be ensured, if necessary also utilising guards patrols;
- 104.2. on the 285th year after the closure of the radioactive waste disposal or management undertaking the total and specific radioactivity for all radioactive waste packages shall be calculated as it will be on the 300th year after the closure of the undertaking referred to and the state of the packages shall be examined. Damaged radioactive waste packages shall be packaged additionally (for example, 0.2 m³ steel drums shall be emplaced into 0.25 m³ steel drums and the whole empty space between the drums (also beneath and above the 0.2 m³ drum) shall be filled with concrete);
- 104.3. on the 286th year the empty spaces in radioactive waste vaults shall be filled with sand or concrete, taking into account the provisions specified in Paragraph 98 of these Regulations;
- 104.4. on the 290th year additional filling and compacting in the radioactive waste tanks shall be performed if necessary, the covering reinforced concrete layer and all additional layers shall be created;
- 104.5. on the 295th year buildings shall be dismantled, the upper ground layer shall be adjusted, a level surface shall be created above all radioactive waste vaults in the disposal site and concrete markers shall be placed;
- 104.6. on the 300th year the soil layer shall be adjusted, additional concrete markers shall be placed by perimeter and in the disposal site; and
  - 104.7. on the 301st year State supervision shall be terminated.

### XI. Requirements for Return of Spent Ionising Radiation Sources to Manufacturers and Shipment of Radioactive Waste for Processing Outside Latvia

105. The operator who plans to import a spent ionising radiation 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 operator's ownership or possession shall take all the possible measures so that the possibility to return such spent ionising radiation source to its manufacturer is provided for in the purchase and sales or gift contract.

106. The purchase and sales or gift contract shall at least provide for the following provisions:

- 106.1. the maximum time limit during which the spent ionising radiation source may be returned to its supplier shall be 15 years after entering into the purchase and sales or gift contract; and
- 106.2. 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.



- 107. Extracts from the purchase and sales or gift contract regarding the possibility to return a spent ionising radiation source to its supplier shall be submitted to the Centre and the State institution responsible for radiation safety and nuclear safety where the supplier is registered.
- 108. It shall be prohibited to ship radioactive waste to:
  - 108.1. places which are located further than  $60^{\circ}$  in the southern hemisphere;
- 108.2. those African, Caribbean and Pacific States which on 15 December 1989 in Lome signed the Fourth African, Caribbean and Pacific European Economic Community Convention; and
- 108.3. states that do not have sufficient technical, legal or administrative capacity to safely carry out operations with radioactive waste without endangering the environment and the population.
- 109. If the requirements set out in Paragraph 108 of these Regulations are not complied with, the Centre shall ensure that the radioactive waste is returned to that operator whose operations have produced it.
- 110. If shipment of radioactive waste for processing outside Latvia is planned, the operator shall submit to the Centre an application for receipt of the relevant authorisation (Section one of Annex 4). In the application the operator may also request authorisation for several shipments of radioactive waste if:
- 110.1. radioactive waste in all planned shipments will have the same physical and chemical properties, it will contain the same radionuclides and its total and specific radioactivity will be the same;
- 110.2. the radioactive waste shipments in all cases are planned by one and the same operator, one and the same carrier will be utilised and there will be one and the same radioactive waste processor;
- 110.3. in all radioactive waste transportation cases transit countries will be the same and the same border crossing points will be utilised; and
- 110.4. the total shipment period for all radioactive waste shall not be longer than three years.
- 111. The Centre shall send the application and an authorisation form of the competent institution (sample of the authorisation in Section two of Annex 4) to the competent institution of that state in which the processing of radioactive waste is planned to be performed and to the competent institutions of all those state through which it is planned to transport such radioactive waste, as well as request provision of an opinion in respect of the application.
- 112. If official authorisation is received from all competent institutions of those states to which the application to authorise shipment of radioactive waste for processing outside Latvia was sent, the Centre may issue an authorisation for the radioactive waste export for processing (sample of the authorisation Section three of Annex 4).
- 113. A copy of the authorisation issued by the Centre shall be sent to the radioactive waste processor together with other necessary documents specified in Cabinet Regulation No 307 of 3



July 2001, Regulations Regarding Protection Against Ionising Radiation During Transportation of Radioactive Materials and other regulatory enactments.

- 114. The undertaking to which radioactive waste has been shipped for processing shall within a period of 15 days after receipt of the radioactive waste at the processing site send to the competent institution of its state an acknowledgement (Sections four and five of Annex 4) regarding receipt of such radioactive waste but to all competent institutions of those states which were involved in the authorisation of such consignment copies of the acknowledgement.
- 115. The procedures referred to in Paragraphs 108, 109, 110, 111, 112, 113 and 114 of these Regulations shall not be applied if spent sealed radiation sources (except for nuclear materials) in conformity with the purchase and sales or gift contracts are returned to the manufacturers thereof.
- 116. The operator may not refuse to accept the radioactive waste back if due to any reason the shipment of radioactive waste cannot be completed.

### **XII. Closing Provision**

117. The Environmental Protection and Regional Development Ministry in accordance with the procedures set out in law shall authorise an institution, which until creation of a geological repository shall store all long-lived radioactive waste.

Prime Minister A. Bērziņš

Minister for Environmental Protection and Regional Development

V. Makarovs



### **Minimum Significant Specific Radioactivity**

Table 1

Minimum Significant Specific Radioactivity for Various Materials

No	Radionu clide	Radioactive contamination on the surface if materials are used again (Bq/cm <sup>2</sup> )	Specific radioactivity if concrete construction debris is used (Bq/g)	Specific radioactivity on a municipal or hazardous waste landfill site or dump if materials related to radioactive waste are disposed of (Bq/g)
1.	$3_{\mathrm{H}}$	1 x 10 <sup>4</sup>	3 x 10 <sup>4</sup>	1 x 10 <sup>5</sup>
2.	14C	1 x 10 <sup>2</sup>	3 x 10 <sup>2</sup>	1 x 10 <sup>3</sup>
3.	22Na	1 x 10-1	3 x 10 <sup>-1</sup>	1 x 10 <sup>0</sup>
4.	$24_{Na}$	1 x 10 <sup>-1</sup>	3 x 10 <sup>-1</sup>	1 x 10 <sup>0</sup>
5.	32 <sub>P</sub>	1 x 10 <sup>-1</sup>	3 x 10 <sup>1</sup>	1 x 10 <sup>2</sup>
6.	35 <sub>S</sub>	1 x 10 <sup>3</sup>	3 x 10 <sup>3</sup>	1 x 10 <sup>4</sup>
7.	36Cl	1 x 10 <sup>2</sup>	3 x 10 <sup>2</sup>	1 x 10 <sup>3</sup>
8.	45Ca	1 x 10 <sup>2</sup>	3 x 10 <sup>2</sup>	1 x 10 <sup>3</sup>
9.	51Cr	1 x 10 <sup>1</sup>	3 x 10 <sup>1</sup>	1 x 10 <sup>2</sup>
10.	54 <sub>Mn</sub>	1 x 10 <sup>0</sup>	3 x 10-1	1 x 10 <sup>0</sup>
11.	55 <sub>Fe</sub>	1 x 10 <sup>2</sup>	3 x 10 <sup>2</sup>	1 x 10 <sup>3</sup>
12.	59 <sub>Fe</sub>	1 x 10 <sup>0</sup>	3 x 10-1	1 x 10 <sup>0</sup>
13.	57 <sub>Co</sub>	1 x 10 <sup>1</sup>	3 x 10 <sup>0</sup>	1 x 10 <sup>1</sup>
14.	58Co	1 x 100	3 x 10-1	1 x 10 <sup>0</sup>
15.	60Co	1 x 10 <sup>0</sup>	3 x 10 <sup>-1</sup>	1 x 10 <sup>0</sup>
16.	63 <sub>Ni</sub>	1 x 10 <sup>3</sup>	3 x 10 <sup>3</sup>	1 x 10 <sup>4</sup>
17.	65 <sub>Zn</sub>	1 x 10 <sup>1</sup>	3 x 10 <sup>-1</sup>	1 x 10 <sup>0</sup>
18.	89 <sub>Sr</sub>	1 x 10 <sup>1</sup>	3 x 10 <sup>1</sup>	1 x 10 <sup>2</sup>
19.	90 <sub>Sr</sub>	1 x 10 <sup>0</sup>	3 x 10 <sup>0</sup>	1 x 10 <sup>1</sup>
20.	90Y	1 x 10 <sup>0</sup>	3 x 10 <sup>1</sup>	1 x 10 <sup>2</sup>
21.	94 <sub>Nb</sub>	1 x 10 <sup>0</sup>	3 x 10-1	1 x 10 <sup>0</sup>
22.	99m <sub>Tc</sub>	1 x 10 <sup>0</sup>	3 x 10 <sup>0</sup>	1 x 10 <sup>1</sup>
23.	99Tc	1 x 10 <sup>1</sup>	3 x 10 <sup>2</sup>	1 x 10 <sup>3</sup>
24.	106 <sub>Ru</sub>	1 x 10 <sup>1</sup>	3 x 10 <sup>0</sup>	1 x 10 <sup>1</sup>



25.	110m <sub>Ag</sub>	1 x 10 <sup>0</sup>	3 x 10 <sup>-1</sup>	1 x 10 <sup>0</sup>
26.	109Cd	1 x 10 <sup>2</sup>	3 x 10 <sup>2</sup>	1 x 10 <sup>3</sup>
27.	111 <sub>In</sub>	1 x 10 <sup>0</sup>	3 x 10 <sup>0</sup>	1 x 10 <sup>1</sup>
28.	124 <sub>Sb</sub>	1 x 10 <sup>0</sup>	3 x 10 <sup>-1</sup>	1 x 10 <sup>0</sup>
29.	125 <sub>I</sub>	1 x 10 <sup>1</sup>	3 x 10 <sup>1</sup>	1 x 10 <sup>2</sup>
30.	129 <sub>I</sub>	1 x 10 <sup>0</sup>	3 x 10 <sup>0</sup>	1 x 10 <sup>1</sup>
31.	131 <sub>I</sub>	1 x 10 <sup>1</sup>	3 x 10 <sup>0</sup>	1 x 10 <sup>1</sup>
32.	134 <sub>Cs</sub>	1 x 10 <sup>0</sup>	3 x 10-1	1 x 10 <sup>0</sup>
33.	137 <sub>Cs</sub>	1 x 10 <sup>0</sup>	3 x 10 <sup>-1</sup>	1 x 10 <sup>0</sup>
34.	144Ce	1 x 10 <sup>0</sup>	3 x 10 <sup>0</sup>	1 x 10 <sup>1</sup>
35.	147 <sub>Pm</sub>	1 x 10 <sup>2</sup>	3 x 10 <sup>2</sup>	1 x 10 <sup>3</sup>
36.	152 <sub>Eu</sub>	1 x 10 <sup>0</sup>	3 x 10 <sup>-1</sup>	1 x 10 <sup>0</sup>
37.	192 <sub>Ir</sub>	1 x 10 <sup>0</sup>	3 x 10 <sup>-1</sup>	1 x 10 <sup>0</sup>
38.	204 <sub>Tl</sub>	1 x 10 <sup>1</sup>	3 x 10 <sup>0</sup>	1 x 10 <sup>1</sup>
39.	210 <sub>Pb</sub>	1 x 10 <sup>-1</sup>	3 x 10 <sup>-1</sup>	1 x 10 <sup>0</sup>
40.	210 <sub>Po</sub>	1 x 10-1	3 x 10-1	1 x 10 <sup>0</sup>
41.	226 <sub>Ra</sub>	1 x 10-1	3 x 10-1	1 x 10 <sup>0</sup>
42.	$228_{Ra}$	1 x 10 <sup>-1</sup>	3 x 10 <sup>-1</sup>	1 x 10 <sup>0</sup>
43.	228 <sub>Th</sub>	1 x 10 <sup>-1</sup>	3 x 10 <sup>-2</sup>	1 x 10 <sup>-1</sup>
44.	230 <sub>Th</sub>	1 x 10 <sup>-1</sup>	3 x 10 <sup>-2</sup>	1 x 10 <sup>-1</sup>
45.	232 <sub>Th</sub>	1 x 10 <sup>-1</sup>	3 x 10 <sup>-2</sup>	1 x 10 <sup>-1</sup>
46.	234U	1 x 10-1	3 x 10-1	1 x 10 <sup>0</sup>
47.	235U	1 x 10-1	3 x 10 <sup>-1</sup>	1 x 10 <sup>0</sup>
48.	238U	1 x 10-1	3 x 10 <sup>-1</sup>	1 x 10 <sup>0</sup>
49.	$237_{Np}$	1 x 10-1	3 x 10 <sup>-2</sup>	1 x 10-1
50.	239 <sub>Pu</sub>	1 x 10-1	3 x 10 <sup>-2</sup>	1 x 10-1
51.	240 <sub>Pu</sub>	1 x 10-1	3 x 10-2	1 x 10-1
52.	241 <sub>Pu</sub>	1 x 10-1	3 x 10 <sup>0</sup>	1 x 101
53.	241 <sub>Am</sub>	1 x 10 <sup>-1</sup>	3 x 10 <sup>-2</sup>	1 x 10-1
54.	244Cm	1 x 10 <sup>-1</sup>	3 x 10 <sup>-1</sup>	1 x 10 <sup>0</sup>



Table 2

Minimum Significant Specific Radioactivity for Scrap Metal

No.	Radionuclide	Specific radioactivity for scrap metal containing iron (Bq/g)	Specific radioactivity for scrap metal containing copper (Bq/g)	Specific radioactivity for scrap metal containing aluminium (Bq/g)
1.	$3_{\mathrm{H}}$	1 x 10 <sup>3</sup>	9 x 10 <sup>4</sup>	2 x 10 <sup>4</sup>
2.	14 <sub>C</sub>	8 x 10 <sup>1</sup>	3 x 10 <sup>3</sup>	6 x 10 <sup>2</sup>
3.	$22_{Na}$	2 x 10 <sup>-1</sup>	2 x 10 <sup>0</sup>	4 x 10 <sup>-1</sup>
4.	$24_{\text{Na}}$	6 x 10 <sup>-1</sup>	6 x 10 <sup>-1</sup>	6 x 10 <sup>-1</sup>
5.	32p	2 x 10 <sup>2</sup>	2 x 10 <sup>2</sup>	2 x 10 <sup>2</sup>
6.	35 <sub>S</sub>	6 x 10 <sup>2</sup>	1 x 10 <sup>4</sup>	3 x 10 <sup>3</sup>
7.	36Cl	1 x 10 <sup>1</sup>	3 x 10 <sup>2</sup>	4 x 10 <sup>2</sup>
8.	45Ca	6 x 10 <sup>2</sup>	6 x 10 <sup>2</sup>	1 x 10 <sup>3</sup>
9.	51 <sub>Cr</sub>	7 x 101	7 x 10 <sup>1</sup>	7 x 10 <sup>1</sup>
10.	54 <sub>Mn</sub>	2 x 10 <sup>0</sup>	4 x 10 <sup>0</sup>	4 x 10 <sup>0</sup>
11.	55 <sub>Fe</sub>	3 x 10 <sup>4</sup>	3 x 10 <sup>4</sup>	7 x 10 <sup>4</sup>
12.	59 <sub>Fe</sub>	2 x 10 <sup>0</sup>	2 x 10 <sup>0</sup>	2 x 10 <sup>0</sup>
13.	57 <sub>Co</sub>	2 x 10 <sup>1</sup>	2 x 10 <sup>2</sup>	3 x 10 <sup>1</sup>
14.	58Co	1 x 10 <sup>0</sup>	4 x 10 <sup>0</sup>	4 x 10 <sup>0</sup>
15.	60Co	6 x 10 <sup>-1</sup>	1 x 10 <sup>0</sup>	1 x 10 <sup>0</sup>
16.	63 <sub>Ni</sub>	3 x 10 <sup>5</sup>	2 x 10 <sup>4</sup>	1 x 10 <sup>5</sup>
17.	65Zn	5 x 10-1	5 x 10 <sup>0</sup>	5 x 10 <sup>0</sup>
18.	89 <sub>Sr</sub>	6 x 10 <sup>1</sup>	6 x 10 <sup>1</sup>	6 x 10 <sup>1</sup>
19.	90 <sub>Sr</sub>	1 x 10 <sup>1</sup>	9 x 10 <sup>0</sup>	4 x 10 <sup>1</sup>
20.	90Y	9 x 10 <sup>1</sup>	3 x 10 <sup>1</sup>	9 x 10 <sup>1</sup>
21.	94 <sub>Nb</sub>	4 x 10-1	9 x 10-1	6 x 10 <sup>-1</sup>
22.	99m <sub>Tc</sub>	2 x 101	2 x 101	2 x 10 <sup>1</sup>
23.	99 <sub>Tc</sub>	4 x 10 <sup>1</sup>	4 x 10 <sup>2</sup>	5 x 10 <sup>2</sup>
24.	106 <sub>Ru</sub>	1 x 10 <sup>0</sup>	7 x 10 <sup>0</sup>	9 x 10 <sup>0</sup>
25.	110mAg	5 x 10 <sup>-1</sup>	5 x 10-1	1 x 10 <sup>0</sup>
26.	109 <sub>Cd</sub>	1 x 10 <sup>1</sup>	3 x 10 <sup>2</sup>	2 x 10 <sup>2</sup>
27.	111 <sub>In</sub>	6 x 10 <sup>0</sup>	6 x 10 <sup>0</sup>	6 x 10 <sup>0</sup>
28.	124 <sub>Sb</sub>	8 x 10-1	8 x 10-1	5 x 10-1
29.	125 <sub>I</sub>	3 x 10 <sup>0</sup>	1 x 10 <sup>2</sup>	1 x 10 <sup>2</sup>
30.	129 <sub>I</sub>	4 x 10 <sup>-1</sup>	2 x 10 <sup>1</sup>	6 x 10 <sup>1</sup>



31.	131 <sub>I</sub>	6 x 10 <sup>0</sup>	6 x 10 <sup>0</sup>	6 x 10 <sup>0</sup>
32.	134 <sub>Cs</sub>	2 x 10 <sup>-1</sup>	2 x 10 <sup>0</sup>	6 x 10 <sup>-1</sup>
33.	137 <sub>Cs</sub>	6 x 10 <sup>-1</sup>	7 x 10 <sup>0</sup>	2 x 10 <sup>0</sup>
34.	144Ce	1 x 10 <sup>1</sup>	2 x 10 <sup>1</sup>	2 x 10 <sup>1</sup>
35.	147 <sub>Pm</sub>	6 x 10 <sup>3</sup>	7 x 10 <sup>4</sup>	3 x 10 <sup>4</sup>
36.	152 <sub>Eu</sub>	5 x 10 <sup>-1</sup>	3 x 10 <sup>0</sup>	8 x 10 <sup>-1</sup>
37.	192 <sub>Ir</sub>	2 x 10 <sup>0</sup>	6 x 10 <sup>0</sup>	4 x 10 <sup>0</sup>
38.	204 <sub>Tl</sub>	$3 \times 10^{2}$	4 x 10 <sup>2</sup>	5 x 10 <sup>2</sup>
39.	210 <sub>Pb</sub>	7 x 10-2	1 x 10 <sup>0</sup>	3 x 10 <sup>-1</sup>
40.	210 <sub>Po</sub>	2 x 100	2 x 10 <sup>1</sup>	2 x 10 <sup>0</sup>
41.	226 <sub>Ra</sub>	4 x 10-1	9 x 10-1	5 x 10-1
42.	$228_{Ra}$	7 x 10 <sup>-1</sup>	2 x 10 <sup>0</sup>	1 x 10 <sup>0</sup>
43.	228 <sub>Th</sub>	4 x 10 <sup>-1</sup>	1 x 10 <sup>0</sup>	6 x 10 <sup>-1</sup>
44.	230 <sub>Th</sub>	3 x 10 <sup>-1</sup>	2 x 10 <sup>0</sup>	4 x 10 <sup>0</sup>
45.	232 <sub>Th</sub>	3 x 10 <sup>-1</sup>	2 x 10 <sup>0</sup>	4 x 10 <sup>0</sup>
46.	234U	3 x 100	7 x 10 <sup>0</sup>	2 x 10 <sup>0</sup>
47.	235U	3 x 100	8 x 100	8 x 10-1
48.	238U	4 x 10 <sup>0</sup>	8 x 10 <sup>0</sup>	2 x 10 <sup>0</sup>
49.	237 <sub>Np</sub>	6 x 10 <sup>-1</sup>	3 x 10 <sup>0</sup>	7 x 10 <sup>0</sup>
50.	239 <sub>Pu</sub>	2 x 10-1	2 x 10 <sup>0</sup>	3 x 10 <sup>0</sup>
51.	240 <sub>Pu</sub>	3 x 10 <sup>-1</sup>	2 x 10 <sup>0</sup>	3 x 10 <sup>0</sup>
52.	241 <sub>Pu</sub>	1 x 101	8 x 10 <sup>1</sup>	2 x 10 <sup>2</sup>
53.	241 <sub>Am</sub>	3 x 10 <sup>-1</sup>	2 x 10 <sup>0</sup>	4 x 10 <sup>0</sup>
54.	244Cm	6 x 10 <sup>-1</sup>	3 x 10 <sup>0</sup>	6 x 10 <sup>0</sup>

Minister for Environmental Protection and Regional Development

V. Makarovs



# Maximum Permissible Total and Specific Radioactivity if Radioactive Waste is Transported in $0.1~\mathrm{m}^3$ Steel Drums Without Additional Treatment (LSA-III)

No	Radionuclide	Maximum permissible specific radioactivity (Bq/kg)	Maximum permissible total radioactivity for a package (Bq)
1.	3H	4 x 1011	1 x 1013
2.	$7_{\mathrm{Be}}$	2 x 10 <sup>11</sup>	1 x 10 <sup>12</sup>
3.	14 <sub>C</sub>	3 x 10 <sup>7</sup>	1 x 10 <sup>9</sup>
4.	$22_{\text{Na}}$	5 x 10 <sup>9</sup>	1 x 10 <sup>10</sup>
5.	35 <sub>S</sub>	3 x 10 <sup>10</sup>	1 x 10 <sup>12</sup>
6.	36Cl	1 x 10 <sup>5</sup>	1 x 106
7.	40K	1 x 106	1 x 10 <sup>7</sup>
8.	45Ca	1 x 10 <sup>10</sup>	1 x 10 <sup>12</sup>
9.	46 <sub>Sc</sub>	1 x 10 <sup>9</sup>	1 x 10 <sup>10</sup>
10.	51Cr	3 x 10 <sup>11</sup>	1 x 10 <sup>12</sup>
11.	53Mn	1 x 10 <sup>7</sup>	1 x 10 <sup>9</sup>
12.	54 <sub>Mn</sub>	1 x 10 <sup>10</sup>	1 x 10 <sup>12</sup>
13.	55 <sub>Fe</sub>	1 x 10 <sup>11</sup>	1 x 10 <sup>12</sup>
14.	56 <sub>Co</sub>	1 x 10 <sup>9</sup>	1 x 10 <sup>10</sup>
15.	57 <sub>Co</sub>	1 x 10 <sup>11</sup>	1 x 10 <sup>12</sup>
16.	58Co	1 x 10 <sup>10</sup>	1 x 10 <sup>11</sup>
17.	60Co	1 x 10 <sup>9</sup>	1 x 10 <sup>10</sup>
18.	59 <sub>Ni</sub>	1 x 10 <sup>7</sup>	1 x 10 <sup>8</sup>
19.	63 <sub>Ni</sub>	1 x 108	1 x 10 <sup>9</sup>
20.	65Zn	6 x 10 <sup>9</sup>	1 x 10 <sup>11</sup>
21.	73 <sub>As</sub>	4 x 10 <sup>11</sup>	1 x 10 <sup>12</sup>
22.	75 <sub>Se</sub>	1 x 10 <sup>10</sup>	1 x 10 <sup>11</sup>
23.	81 <sub>Kr</sub>	1 x 108	1 x 10 <sup>9</sup>
24.	85 <sub>Kr</sub>	1 x 10 <sup>11</sup>	1 x 10 <sup>12</sup>
25.	85 <sub>Sr</sub>	1 x 1010	1 x 10 <sup>11</sup>
26.	89 <sub>Sr</sub>	6 x 10 <sup>9</sup>	1 x 10 <sup>11</sup>
27.	90 <sub>Sr+</sub>	3 x 108	1 x 10 <sup>9</sup>
28.	91 <b>Y</b>	6 x 10 <sup>9</sup>	1 x 1011



29.	93Zr+	1 x 10 <sup>7</sup>	1 x 10 <sup>8</sup>
30.	95 <sub>Zr</sub>	8 x 10 <sup>9</sup>	1 x 10 <sup>11</sup>
31.	93m <sub>Nb</sub>	3 x 10 <sup>11</sup>	1 x 10 <sup>12</sup>
32.	94Nb	1 x 10 <sup>5</sup>	1 x 10 <sup>6</sup>
33.	93 <sub>Mo</sub>	1 x 10 <sup>7</sup>	1 x 108
34.	97 <sub>Tc</sub>	1 x 10 <sup>7</sup>	1 x 10 <sup>8</sup>
35.	97m <sub>Tc</sub>	1 x 10 <sup>11</sup>	1 x 10 <sup>12</sup>
36.	99Tc	1 x 10 <sup>7</sup>	1 x 10 <sup>8</sup>
37.	106 <sub>Ru+</sub>	2 x 10 <sup>9</sup>	1 x 10 <sup>10</sup>
38.	110mAg	1 x 10 <sup>9</sup>	1 x 10 <sup>10</sup>
39.	109Cd	2 x 10 <sup>10</sup>	1 x 10 <sup>12</sup>
40.	113 <sub>Sn</sub>	1 x 10 <sup>10</sup>	1 x 10 <sup>11</sup>
41.	124 <sub>Sb</sub>	6 x 10 <sup>9</sup>	1 x 10 <sup>11</sup>
42.	125 <sub>Sb</sub>	1 x 10 <sup>10</sup>	1 x 10 <sup>11</sup>
43.	123m <sub>Te</sub>	1 x 10 <sup>10</sup>	1 x 10 <sup>12</sup>
44.	125mTe	9 x 10 <sup>9</sup>	1 x 10 <sup>12</sup>
45.	127m <sub>Te</sub>	7 x 10 <sup>9</sup>	1 x 10 <sup>12</sup>
46.	125 <sub>I</sub>	3 x 10 <sup>10</sup>	1 x 10 <sup>12</sup>
47.	129 <sub>I</sub>	1 x 10 <sup>6</sup>	1 x 10 <sup>7</sup>
48.	134 <sub>Cs</sub>	7 x 10 <sup>9</sup>	1 x 10 <sup>11</sup>
49.	135 <sub>Cs</sub>	1 x 10 <sup>8</sup>	1 x 10 <sup>9</sup>
50.	137 <sub>Cs+</sub>	1 x 10 <sup>9</sup>	1 x 10 <sup>10</sup>
51.	139 <sub>Ce</sub>	2 x 10 <sup>10</sup>	1 x 10 <sup>12</sup>
52.	144 <sub>Ce+</sub>	1 x 10 <sup>9</sup>	1 x 10 <sup>10</sup>
53.	151 <sub>Sm</sub>	1 x 10 <sup>8</sup>	1 x 10 <sup>9</sup>
54.	152 <sub>Eu</sub>	1 x 10 <sup>9</sup>	1 x 10 <sup>10</sup>
55.	154Eu	6 x 10 <sup>9</sup>	1 x 1011
56.	155 <sub>Eu</sub>	3 x 1010	1 x 10 <sup>12</sup>
57.	153 <sub>Gd</sub>	9 x 10 <sup>10</sup>	1 x 10 <sup>12</sup>
58.	160 <sub>Tb</sub>	6 x 10 <sup>9</sup>	1 x 10 <sup>11</sup>
59.	170 <sub>Tm</sub>	6 x 10 <sup>9</sup>	1 x 10 <sup>11</sup>
60.	171 <sub>Tm</sub>	1 x 10 <sup>10</sup>	1 x 10 <sup>11</sup>
61.	182 <sub>Ta</sub>	5 x 10 <sup>9</sup>	1 x 10 <sup>11</sup>
62.	181W	3 x 10 <sup>11</sup>	1 x 1012
63.	185W	8 x 10 <sup>9</sup>	1 x 10 <sup>12</sup>
64.	185 <sub>Os</sub>	1 x 10 <sup>10</sup>	1 x 10 <sup>11</sup>
65.	192 <sub>Ir</sub>	5 x 10 <sup>9</sup>	1 x 10 <sup>12</sup>
66.	204 <sub>Tl</sub>	7 x 10 <sup>9</sup>	1 x 10 <sup>12</sup>



67.	210 <sub>Pb+</sub>	1 x 10 <sup>8</sup>	1 x 10 <sup>9</sup>
68.	207 <sub>Bi</sub>	1 x 10 <sup>7</sup>	1 x 108
69.	210 <sub>Po</sub>	2 x 10 <sup>9</sup>	1 x 10 <sup>12</sup>
70.	222 <sub>Rn+</sub>	4 x 10 <sup>7</sup>	1 x 10 <sup>10</sup>
71.	226 <sub>Ra+</sub>	1 x 10 <sup>5</sup>	1 x 106
72.	228 <sub>Ra+</sub>	1 x 10 <sup>9</sup>	1 x 10 <sup>10</sup>
73.	228 <sub>Th+</sub>	1 x 10 <sup>7</sup>	1 x 10 <sup>10</sup>
74.	229 <sub>Th+</sub>	1 x 10 <sup>4</sup>	1 x 10 <sup>5</sup>
75.	230 <sub>Th</sub>	1 x 10 <sup>4</sup>	1 x 10 <sup>5</sup>
76.	dab.Th	1 x 10 <sup>4</sup>	1 x 10 <sup>5</sup>
77.	231 <sub>Pa</sub>	1 x 10 <sup>4</sup>	1 x 10 <sup>5</sup>
78.	232 <sub>U+</sub>	1 x 10 <sup>5</sup>	1 x 10 <sup>6</sup>
79.	233U	1 x 10 <sup>4</sup>	1 x 10 <sup>5</sup>
80.	234 <sub>U</sub>	1 x 10 <sup>4</sup>	1 x 10 <sup>5</sup>
81.	235 <sub>U+</sub>	1 x 10 <sup>4</sup>	1 x 10 <sup>5</sup>
82.	236U	1 x 10 <sup>4</sup>	1 x 10 <sup>5</sup>
83.	238U+	1 x 10 <sup>4</sup>	1 x 10 <sup>5</sup>
84.	237 <sub>Np+</sub>	1 x 10 <sup>4</sup>	1 x 10 <sup>5</sup>
85.	236 <sub>Pu</sub>	1 x 10 <sup>3</sup>	1 x 10 <sup>4</sup>
86.	238 <sub>Pu</sub>	1 x 10 <sup>4</sup>	1 x 10 <sup>5</sup>
87.	239 <sub>Pu</sub>	1 x 10 <sup>4</sup>	1 x 10 <sup>5</sup>
88.	240 <sub>Pu</sub>	1 x 10 <sup>4</sup>	1 x 10 <sup>5</sup>
89.	241 <sub>Pu</sub>	1 x 10 <sup>5</sup>	1 x 10 <sup>6</sup>
90.	242 <sub>Pu</sub>	1 x 10 <sup>5</sup>	1 x 10 <sup>6</sup>
91.	244 <sub>Pu</sub>	1 x 10 <sup>4</sup>	1 x 10 <sup>5</sup>
92.	241Am	1 x 10 <sup>4</sup>	1 x 10 <sup>5</sup>
93.	242m <sub>Am+</sub>	1 x 10 <sup>4</sup>	1 x 10 <sup>5</sup>
94.	243 <sub>Am+</sub>	1 x 10 <sup>4</sup>	1 x 10 <sup>5</sup>
95.	242 <sub>Cm</sub>	1 x 10 <sup>6</sup>	1 x 10 <sup>7</sup>
96.	243 <sub>Cm</sub>	1 x 10 <sup>6</sup>	1 x 10 <sup>7</sup>
97.	244Cm	1 x 10 <sup>6</sup>	1 x 10 <sup>7</sup>
98.	245 <sub>Cm</sub>	1 x 10 <sup>4</sup>	1 x 10 <sup>5</sup>
99.	246Cm	1 x 10 <sup>4</sup>	1 x 10 <sup>5</sup>
100.	247 <sub>Cm</sub>	1 x 10 <sup>4</sup>	1 x 10 <sup>5</sup>
101.	248 <sub>Cm</sub>	1 x 10 <sup>4</sup>	1 x 10 <sup>5</sup>
102.	249 <sub>Bk</sub>	1 x 10 <sup>5</sup>	1 x 106
103.	248 <sub>Cf</sub>	1 x 106	1 x 10 <sup>7</sup>
104.	249Cf	1 x 10 <sup>4</sup>	1 x 10 <sup>5</sup>



105.	250Cf	1 x 10 <sup>5</sup>	1 x 10 <sup>6</sup>
106.	251Cf	1 x 10 <sup>4</sup>	1 x 10 <sup>5</sup>
107.	252 <sub>Cf</sub>	1 x 10 <sup>7</sup>	1 x 10 <sup>8</sup>
108.	253Cf	1 x 106	1 x 10 <sup>7</sup>
109.	254Cf	1 x 10 <sup>7</sup>	1 x 10 <sup>8</sup>

Minister for Environmental Protection and Regional Development

V. Makarovs

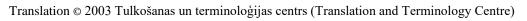


## Maximum Permissible Total Radioactivity of Radioactive Waste Upon Disposal Thereof in Near-Surface Repository (in a Vault, for Package and Spent Sealed Radiation Source)

No	Radionuclide	Maximum	Maximum permissible	Maximum permissible
•		permissible total	total radioactivity for a 0.2 m <sup>3</sup> radioactive	total radioactivity for a
		radioactivity in a 100 m <sup>3</sup> radioactive waste	waste package (Bq)	spent sealed radiation source (Bq)
		vault (Bq)	waste package (Eq)	source (Bq)
		` 1		
1.	3 <sub>H</sub>	1 x 10 <sup>17</sup>	1 x 10 <sup>13</sup>	1 x 10 <sup>7</sup>
2.	$7_{\mathrm{Be}}$	no limit	1 x 1013	3 x 1010
3.	14 <sub>C</sub>	1 x 10 <sup>13</sup>	1 x 1010	1 x 10 <sup>8</sup>
4.	22 <sub>Na</sub>	no limit	1 x 10 <sup>11</sup>	3 x 10 <sup>10</sup>
5.	35 <sub>S</sub>	no limit	1 x 10 <sup>13</sup>	3 x 10 <sup>11</sup>
6.	36Cl	3 x 10 <sup>12</sup>	5 x 10 <sup>9</sup>	1 x 10 <sup>7</sup>
7.	40K	1 x 1011	1 x 10 <sup>9</sup>	1 x 108
8.	45Ca	no limit	1 x 10 <sup>13</sup>	3 x 1011
9.	46Sc	no limit	1 x 10 <sup>11</sup>	3 x 10 <sup>10</sup>
10.	51 <sub>Cr</sub>	no limit	1 x 10 <sup>13</sup>	3 x 10 <sup>10</sup>
11.	53Mn	1 x 10 <sup>12</sup>	1 x 10 <sup>10</sup>	1 x 10 <sup>6</sup>
12.	54Mn	no limit	1 x 10 <sup>12</sup>	3 x 108
13.	55Fe	no limit	4 x 1013	1 x 10 <sup>12</sup>
14.	56Co	no limit	3 x 10 <sup>11</sup>	2 x 1010
15.	57 <sub>Co</sub>	no limit	1 x 10 <sup>13</sup>	2 x 10 <sup>12</sup>
16.	58Co	no limit	1 x 10 <sup>12</sup>	2 x 10 <sup>11</sup>
17.	60Co	1 x 10 <sup>22</sup>	1 x 10 <sup>11</sup>	1 x 10 <sup>11</sup>
18.	59 <sub>Ni</sub>	1 x 10 <sup>13</sup>	1 x 10 <sup>10</sup>	3 x 10 <sup>8</sup>
19.	63 <sub>Ni</sub>	1 x 10 <sup>14</sup>	1 x 1011	3 x 108
20.	65Zn	no limit	1 x 10 <sup>12</sup>	1 x 10 <sup>12</sup>
21.	73 <sub>As</sub>	no limit	4 x 10 <sup>13</sup>	3 x 10 <sup>10</sup>
22.	75 <sub>Se</sub>	no limit	3 x 10 <sup>12</sup>	3 x 10 <sup>10</sup>
23.	81 <sub>Kr</sub>	1 x 10 <sup>13</sup>	1 x 10 <sup>10</sup>	3 x 10 <sup>7</sup>
24.	85 <sub>Kr</sub>	1 x 10 <sup>19</sup>	1 x 10 <sup>13</sup>	1 x 10 <sup>8</sup>
25.	85 <sub>Sr</sub>	no limit	2 x 10 <sup>12</sup>	3 x 1010
26.	89 <sub>Sr</sub>	no limit	1 x 10 <sup>12</sup>	3 x 10 <sup>10</sup>
27.	90 <sub>Sr+</sub>	1 x 10 <sup>11</sup>	1 x 10 <sup>10</sup>	3 x 10 <sup>9</sup>



28.	91γ	no limit	1 x 10 <sup>12</sup>	3 x 10 <sup>10</sup>
29.	93 <sub>Zr+</sub>	1 x 10 <sup>12</sup>	1 x 10 <sup>10</sup>	3 x 10 <sup>8</sup>
30.	95 <sub>Zr</sub>	no limit	1 x 10 <sup>12</sup>	3 x 10 <sup>10</sup>
31.	93m <sub>Nb</sub>	1 x 1015	1 x 10 <sup>13</sup>	3 x 10 <sup>6</sup>
32.	94Nb	1 x 10 <sup>9</sup>	1 x 10 <sup>7</sup>	3 x 10 <sup>6</sup>
33.	93 <sub>Mo</sub>	1 x 10 <sup>12</sup>	1 x 10 <sup>10</sup>	3 x 10 <sup>8</sup>
34.	97 <sub>Tc</sub>	1 x 10 <sup>12</sup>	1 x 10 <sup>10</sup>	3 x 10 <sup>6</sup>
35.	97m <sub>Tc</sub>	1 x 10 <sup>14</sup>	1 x 10 <sup>13</sup>	3 x 10 <sup>6</sup>
36.	99 <sub>Tc</sub>	3 x 10 <sup>12</sup>	5 x 10 <sup>9</sup>	1 x 10 <sup>7</sup>
37.	106 <sub>Ru+</sub>	no limit	2 x 10 <sup>11</sup>	3 x 10 <sup>10</sup>
38.	110mAg	no limit	1 x 10 <sup>11</sup>	1 x 10 <sup>11</sup>
39.	109 <sub>Cd</sub>	no limit	3 x 10 <sup>13</sup>	3 x 10 <sup>11</sup>
40.	113 <sub>Sn</sub>	no limit	1 x 10 <sup>13</sup>	3 x 10 <sup>10</sup>
41.	124 <sub>Sb</sub>	no limit	1 x 10 <sup>12</sup>	1 x 10 <sup>11</sup>
42.	125 <sub>Sb</sub>	no limit	1 x 10 <sup>12</sup>	1 x 10 <sup>11</sup>
43.	123mTe	1 x 1020	1 x 10 <sup>13</sup>	3 x 1010
44.	125m <sub>Te</sub>	no limit	2 x 1013	3 x 1010
45.	127m <sub>Te</sub>	no limit	2 x 10 <sup>13</sup>	3 x 10 <sup>10</sup>
46.	125 <sub>I</sub>	no limit	1 x 10 <sup>13</sup>	1 x 10 <sup>10</sup>
47.	129 <sub>I</sub>	5 x 10 <sup>10</sup>	5 x 10 <sup>7</sup>	3 x 10 <sup>6</sup>
48.	134 <sub>Cs</sub>	no limit	1 x 10 <sup>12</sup>	1 x 10 <sup>11</sup>
49.	135Cs	1 x 1013	1 x 1010	7 x 10 <sup>4</sup>
50.	137 <sub>Cs+</sub>	1 x 10 <sup>12</sup>	3 x 10 <sup>10</sup>	3 x 10 <sup>9</sup>
51.	139Ce	no limit	1 x 10 <sup>13</sup>	3 x 10 <sup>10</sup>
52.	144 <sub>Ce+</sub>	no limit	1 x 10 <sup>11</sup>	7 x 10 <sup>10</sup>
53.	151 <sub>Sm</sub>	1 x 10 <sup>13</sup>	1 x 10 <sup>10</sup>	3 x 10 <sup>9</sup>
54.	152 <sub>Eu</sub>	1 x 1013	1 x 10 <sup>12</sup>	3 x 10 <sup>10</sup>
55.	154 <sub>Eu</sub>	1 x 1016	1 x 10 <sup>12</sup>	7 x 1010
56.	155 <sub>Eu</sub>	no limit	1 x 10 <sup>13</sup>	7 x 10 <sup>10</sup>
57.	153 <sub>Gd</sub>	no limit	1 x 10 <sup>13</sup>	7 x 10 <sup>10</sup>
58.	160 <sub>Tb</sub>	no limit	1 x 10 <sup>12</sup>	3 x 10 <sup>10</sup>
59.	170 <sub>Tm</sub>	no limit	1 x 10 <sup>12</sup>	3 x 10 <sup>10</sup>
60.	171 <sub>Tm</sub>	no limit	1 x 1013	7 x 1010
61.	182 <sub>Ta</sub>	no limit	1 x 1012	3 x 1010
62.	181W	no limit	3 x 10 <sup>13</sup>	3 x 10 <sup>11</sup>
63.	185W	no limit	4 x 1013	3 x 10 <sup>11</sup>
64.	185 <sub>Os</sub>	no limit	1 x 10 <sup>12</sup>	1 x 10 <sup>11</sup>
65.	192 <sub>Ir</sub>	no limit	1 x 10 <sup>13</sup>	3 x 10 <sup>12</sup>





66.	204 <sub>Tl</sub>	no limit	1 x 10 <sup>13</sup>	3 x 10 <sup>10</sup>
67.	210 <sub>Pb+</sub>	1 x 10 <sup>12</sup>	1 x 10 <sup>11</sup>	3 x 10 <sup>8</sup>
68.	$207_{\mathrm{Bi}}$	1 x 10 <sup>12</sup>	1 x 1010	3 x 10 <sup>8</sup>
69.	210 <sub>Po</sub>	no limit	1 x 10 <sup>13</sup>	3 x 10 <sup>9</sup>
70.	222 <sub>Rn+</sub>	1 x 10 <sup>12</sup>	1 x 1011	3 x 10 <sup>9</sup>
71.	226 <sub>Ra+</sub>	1 x 10 <sup>9</sup>	5 x 10 <sup>6</sup>	4 x 10 <sup>5</sup>
72.	228 <sub>Ra+</sub>	1 x 10 <sup>19</sup>	1 x 10 <sup>11</sup>	3 x 10 <sup>9</sup>
73.	228 <sub>Th+</sub>	no limit	5 x 10 <sup>11</sup>	3 x 10 <sup>8</sup>
74.	229 <sub>Th+</sub>	3 x 10 <sup>8</sup>	1 x 10 <sup>6</sup>	2 x 10 <sup>5</sup>
75.	230 <sub>Th</sub>	3 x 108	1 x 106	2 x 10 <sup>5</sup>
76.	232 <sub>Th</sub> sec	3 x 108	1 x 106	2 x 10 <sup>5</sup>
77.	231 <sub>Pa</sub>	3 x 10 <sup>8</sup>	1 x 10 <sup>6</sup>	2 x 10 <sup>5</sup>
78.	232 <sub>U+</sub>	3 x 10 <sup>8</sup>	1 x 10 <sup>6</sup>	1 x 10 <sup>6</sup>
79.	233 <sub>U</sub>	3 x 10 <sup>8</sup>	1 x 10 <sup>6</sup>	1 x 10 <sup>6</sup>
80.	234U	3 x 10 <sup>8</sup>	1 x 10 <sup>6</sup>	1 x 10 <sup>6</sup>
81.	235U+	3 x 108	1 x 106	3 x 105
82.	236U	3 x 108	1 x 106	1 x 106
83.	238 <sub>U+</sub>	3 x 10 <sup>8</sup>	1 x 10 <sup>6</sup>	1 x 10 <sup>6</sup>
84.	$237_{Np+}$	3 x 10 <sup>8</sup>	1 x 106	4 x 10 <sup>4</sup>
85.	236 <sub>Pu</sub>	1 x 10 <sup>8</sup>	1 x 10 <sup>6</sup>	3 x 10 <sup>5</sup>
86.	238 <sub>Pu</sub>	3 x 10 <sup>8</sup>	1 x 10 <sup>6</sup>	3 x 10 <sup>5</sup>
87.	239 <sub>Pu</sub>	3 x 108	1 x 106	3 x 105
88.	240 <sub>Pu</sub>	3 x 10 <sup>8</sup>	1 x 10 <sup>6</sup>	3 x 10 <sup>5</sup>
89.	241 <sub>Pu</sub>	1 x 10 <sup>8</sup>	1 x 10 <sup>7</sup>	3 x 10 <sup>5</sup>
90.	242 <sub>Pu</sub>	3 x 10 <sup>8</sup>	1 x 10 <sup>6</sup>	3 x 10 <sup>5</sup>
91.	244 <sub>Pu</sub>	3 x 10 <sup>8</sup>	1 x 10 <sup>6</sup>	3 x 10 <sup>5</sup>
92.	241 <sub>Am</sub>	3 x 108	1 x 106	3 x 10 <sup>5</sup>
93.	242m <sub>Am+</sub>	3 x 108	1 x 106	4 x 10 <sup>4</sup>
94.	243 <sub>Am+</sub>	3 x 10 <sup>8</sup>	1 x 10 <sup>6</sup>	4 x 10 <sup>4</sup>
95.	242Cm	1 x 10 <sup>9</sup>	1 x 10 <sup>8</sup>	1 x 10 <sup>6</sup>
96.	243Cm	1 x 10 <sup>9</sup>	1 x 10 <sup>8</sup>	1 x 10 <sup>6</sup>
97.	244Cm	1 x 10 <sup>9</sup>	1 x 10 <sup>8</sup>	1 x 10 <sup>6</sup>
98.	245Cm	3 x 108	1 x 106	4 x 10 <sup>4</sup>
99.	246Cm	3 x 108	1 x 106	4 x 10 <sup>4</sup>
10	247 <sub>Cm</sub>	3 x 10 <sup>8</sup>	1 x 10 <sup>6</sup>	4 x 10 <sup>4</sup>
0.	2480	2 108	1 106	4 10/
1.	248Cm	3 x 10 <sup>8</sup>	1 x 106	4 x 10 <sup>4</sup>
		l	L	



10	249 <sub>Bk</sub>	1 x 108	1 x 10 <sup>7</sup>	1 x 10 <sup>6</sup>
2.				
10	248Cf	1 x 10 <sup>10</sup>	1 x 10 <sup>8</sup>	3 x 10 <sup>5</sup>
3.				
10	249Cf	3 x 108	1 x 106	4 x 10 <sup>4</sup>
4.				
10	250Cf	1 x 108	1 x 10 <sup>7</sup>	3 x 10 <sup>5</sup>
5.				
10	251 <sub>Cf</sub>	3 x 108	1 x 10 <sup>6</sup>	4 x 10 <sup>4</sup>
6.				
10	252 <sub>Cf</sub>	1 x 10 <sup>10</sup>	1 x 10 <sup>9</sup>	3 x 10 <sup>5</sup>
7.				
10	254Cf	1 x 10 <sup>12</sup>	1 x 10 <sup>9</sup>	1 x 106
8.				

Minister for Environmental Protection and Regional Development

V. Makarovs



All documents the samples of which are given in this Annex shall be printed on white A4 format paper in black letters. In the international transport the English language shall be used and the usage of another official language of the United Nations Organisation understood by all persons involved in the transportation shall be permissible.

# STANDARD DOCUMENT FOR CONTROL OF SHIPMENTS OF RADIOACTIVE WASTE

### **Section 1**

Registration number _	
(to be comp	pleted by the Radiation Safety Centre

### APPLICATION FOR RADIOACTIVE WASTE SHIPMENT AUTHORISATION

1.	Type of shipment <sup>1</sup>
	Shipment to an EU Member State (Type B)
	Receipt from an EU Member State (Type C)
	Transit through an EU Member State (Type D)
	Shipment to a state which is not an EU Member State (Type
	E)
	Receipt from a state which is not an EU Member State
	(Type F)
2.	Application for authorisation for
	A single shipment
	Several shipments     Number of shipments planned
	Planned period of execution
3.	Radioactive waste producer
	(name)
	Contact person
	Address
	Post code
	Telephone Fax



4.	(To be completed if the radioactive waste is not with the producer thereof) Place where radioactive waste is located Address						
	Post code		Town Co	ountry			
	Telephone	·	Fax				
5.	Description	n of radioactive waste _					
	Main radio Maximum Maximum	onuclides alpha radioactivity in a p beta radioactivity in a pa	ackage (GBq) ckage (GBq) package (GBq)				
6.	Total alpha radioactivity (GBq) Total beta radioactivity (GBq) Total gamma radioactivity (GBq) Total number of packages  *Total weight of radioactive waste (kg)  *Total weight with packaging (kg)  *Total volume (additional information)  (*To be completed if the application for authorisation is intended for several shipments)  Description of the radioactive waste package (including plastic bags, 2001 steel drums, ISO transport containers)  Information on labelling of packages (attach the samples of the used labelling, stickers, posters)						
7.	Category	ardous properties Explosive substances ar	nd products				
	Category 2	Compressed, liquefied of	r dissolved under pressure ş	gases			
	Category 3	Inflammable liquids					
	Category 4	4.1. Inflammable solids	and materials				
			spontaneous combustion on contact with water,	□ give off □			
	Category 5	5.1. Oxidising substance	es				
		5.2. Organic peroxides					

Translation © 2003 Tulkošanas un terminoloģijas centrs (Translation and Terminology Centre)



Category 6	6.1. Poisonous substances	
	6.2. Infectious substances	
Category 8	Corrosive substances	
Category 9	Other dangerous substances and products	



8.	<b>Description of causes giving rise to radioactive waste</b> (medical or industrial usage, so								
	research	or		other	cause)				
9.	Purpose of the shipment								
	Radioactive waste from								
	Shipment of radioactive waste for processing or packaging								
	Receipt of radioactive	waste after prod	cessing or pack	kaging					
	Shipment of radioactive waste for temporary storage								
	Receipt of radioactive	waste after tem	porary storage						
	Shipment of radioactiv	e waste for disp	oosal						
	Receipt of equivalent	amount of rad	ioactive waste	e in connection with	disposal thereof				
	outside the Republic of Latvia								
	Other purposes								
10.	Planned form of trai	nsport Point o	of departure	Point of	Planned carrier				
10.	(road, rail, air, sea ve	-	i departure	destination	Trainica carrier				
	river vessels)	235013,		destination					
	1								
	2								
	3								
	4								
	5								
11									
11.					ated the country where				
	the radioactive waste is			5	1) 7				
	1 2			5 5					
	۷	T		J	_   0				
12.	Consignee of radioact	tive waste at th	e point of des	tination					
					(legal name)				
	Contact person								
	Address				<del></del>				
	Post code		Town _		ountry				
	Telephone			Fax					



13.	(To be completed if the radioactive waste is received by an intermediary organisation)						
	Place to which the radioactive	ve waste shall be delivered		<u>-</u>			
	Address		<del></del>				
	Post code	Town	Country				
	Telephone			_			
14.	Applicant of the authorisation	on					
	Contact person		(legal name)				
	Address						
	Post code	Town	Country				
	Telephone	Fax		_			
15.	application (once/several tin b) I hereby certify that all s my knowledge) and that the with the requirements set ou c) <sup>2</sup> if the type of shipment is waste if the shipment cannot if the type of shipment is	submitted information is corre shipment (once/several times) at in regulatory enactments; is B, D or E — I undertake to t be completed; C or F — I attach a declarate undertakes to take back al	ct and accurate (to the was carried out in accordance take back all sent radition, which specifies t	best of ordance doactive that the			
	(date and place		(signature and full n	ame)			

Notes.



<sup>&</sup>lt;sup>1</sup> Type A is not specified because in EU Member States it is used to mark movement of radioactive waste between EU Member States only.

<sup>2</sup> The notification text which complies with the type of shipment shall be chosen.

### STANDARD DOCUMENT FOR CONTROL OF RADIOACTIVE WASTE SHIPMENTS

### **Section 2**

Registration number \_\_\_\_\_

## AUTHORISATION FOR SHIPMENT BY THE COMPETENT INSTITUTION

				_			
16.	Type of shipment						
	Type B Shipment to an EU Member State						
	Type C Receipt from an EU Member State						
	Type D Transit through an EU Member Stat						
	Type E Shipment to a state which is not an I	EU Member					
	State						
	Type F Receipt from a state which is not an	EU Member					
	State						
	Authorisation issuer <sup>3</sup>						
	(legal name)						
	Contact person		<del></del>				
			Country				
		own					
17.	Telephone Fa  Date of registration of the submission	X	<del></del>	_			
17.							
	_						
		(signature and	full name)				
	Place for a						
	seal						
	\						
10	4						
18.	Competent institution <sup>4</sup>						
	Country						
	Place of origin of the waste ☐ Transit cou	ntry	Country of destination	1			
	Name of the competent institution			_			
	Contact person						
	Contract Porson		<del></del>				

Translation © 2003 Tulkošanas un terminoloģijas centrs (Translation and Terminology Centre)



Address		<del></del>
Post code	Town	Country
Telephone	Fax	



Appro	val of the radio	pacti	ve waste shipment by the competent instituti
Authorised			Conditions if any
Not authorised			Reasons for the refusal
	Conditions		Reasons for the refusal
			_
			Place for a seal
(date and	1 )		(signature and full name

### Notes.

<sup>3</sup> The issuer of the authorisation subsequent to receipt of an application for radioactive waste shipment authorisation (hereinafter — authorisation) shall without delay complete boxes 16 and 17 of this documents and register the application for the authorisation, as well as prepare the necessary number of authorisation copies for sending to all competent institutions of those states from which consent is required (hereinafter — competent institutions). For each competent institution box 18 shall be completed. The issuer of the authorisation shall prepare a copy of Section 1 and 2 of the document and send it to the relevant competent institution to receive its opinion.



<sup>&</sup>lt;sup>4</sup> The competent institution may supplement or adjust the information specified in box 18 of this document.

<sup>&</sup>lt;sup>5</sup> Within two months after receipt of these documents the competent institution shall complete box 19 of this document and shall send the original of the copy of Section 2 of

this document back to the issuer of the authorisation. The time for taking of the decision may be extended by one month if the competent institution requests such.



### STANDARD DOCUMENT FOR CONTROL OF RADIOACTIVE WASTE SHIPMENTS

### **Section 3**

Registration	number								
_	1 1	1 1	.1	- D	1.	, •	 C .		_

(to be completed by the Radiation Safety Centre)

### RADIOACTIVE WASTE SHIPMENT AUTHORISATION

20.	Issuer of the authorisati	on <sup>6</sup> in o	conform	nity with the						
	type of shipment									
	Type BRadiation Safety (	Centre								
	Type CRadiation Safety (	Centre								
	Type D Competen	t institu	tion of	an EU						
	Member State									
	Type ECompetent institu		the cou	ntry (which						
	is not an EU Member Sta	,								
	Type F Radiation Safety (									
	Legal name of the comp	etent ir	nstituti	on						
	Contact person									
	Address									
	Post code	Town			Country					
	Telephone			Fax						
21.	Authorisation granted		For a	single shipmer	nt 🗆					
	Authorisation not			veral shipmen						
	granted			1						
	Authorisation valid until									
22.	Countries in the order of	f chinn	nent ne	rformance (th	ne first shall he sn	ecified tl	ne .			
22.	country where the waste i									
	Countries		ditions		untries		ditions			
	Countries	yes	no			yes	no			
	1			5						
	2			6						
	3			7						
	4			8						



23.	Conditions (indicating the country imposing the conditions and indicate references to attached documents)	Reason for the refusal		
24.	Competent institutions are informed that the radioactive waste shipment authorisation has been granted or refused.  Place for a seal			
	(date and place)	(signature and full name)		
D 0				

#### PS

- 1. Authorisation shall not release the radioactive waste keeper, carrier, producer, consignee or any other natural person or legal person involved in the shipment of the radioactive waste from liability in respect of failure to perform the relevant requirements.
- 2. When shipping radioactive waste, appropriately completed and approved Sections 1, 3 and 4 of the standard document shall be used as freight accompanying documents.

### Notes.

- <sup>6</sup> The issuer of the authorisation:
- a) when completing box 21 the condition shall be taken into account that the maximum period of validity of the authorisation is three years;
- b) shall send the authorisation to the applicant thereof (the person who has applied for radioactive waste shipment or receipt authorisation), attaching to the document Sections 1, 4 and 5 of this document;
  - c) shall send copies of this document to the competent institutions.



### STANDARD DOCUMENT FOR CONTROL OF RADIOACTIVE WASTE SHIPMENTS

### **Section 4**

Registration number	
_	anlated by the Padiation Safety Centra

(to be completed by the Radiation Safety Centre)

## LIST OF RADIOACTIVE WASTE PACKAGES<sup>7</sup>

25.	Applicant of the authorisation _		
		(legal name)	
	Contact person		
	Address		
		Town Country	
	Telephone	Fax	
26.	Authorisation granted for a shipment	single	
	Authorisation granted for several shipments		
	=	Serial number of the shipment	
27.	Description of radioactive waste _		
	Physical and chemical characteristics		
	ISO transport containers)		
28.			
	Total beta radioactivity (GBq) Total gamma radioactivity (GBq)		
		g)	
	Total volume (additional information	on)	



29.	of each package, total weight of the package (kg/package), weight of radioactive waste			
	in the package (kg/package), radioactivity (GBq/package))			
	(If the space provided above is insufficient additional sheets shall be used or			
20	documents containing the necessary information shall be attached)			
30.	Date of dispatch			
	I hereby certify that all the information provided in this document and in the attached			
	documents (if any) is correct and accurate (to the best of my knowledge).			
	Place for a			
	seal			
	, seal			
	(date and place) (signature and full name)			

### Note.

<sup>7</sup> The list shall be completed by the radioactive waste producer before each shipment (also if the authorisation has been granted for several shipments). This Section of the document (like Sections 1 and 3 of this document) shall be used as a freight accompanying document during the whole period of shipment. After completion of the shipment this document shall be attached to the acknowledgement of radioactive waste receipt.

### STANDARD DOCUMENT FOR CONTROL OF RADIOACTIVE WASTE SHIPMENTS

### **Section 5**

Registration number	
(to be o	completed by the Radiation Safety Centre)

# ACKNOWLEDGEMENT OF RADIOACTIVE WASTE RECEIPT<sup>8</sup>

1.	Consignee of radioactive waste at the point of destination				
	(legal name)				
	Contact person				
	Address				
	Post code Town Country	<u>-</u>			
	Telephone Fax				
	Place where the radioactive waste is stored				
	Contact person				
	Address				
	Post code Town Country				
	Telephone Fax				
	Authorisation granted for a single shipment				
	Authorisation granted for several shipments				
	Serial number of the shipment				
	It is the last shipment to which the authorisation is Yes \( \subseteq \text{No} \subseteq \text{No} \subseteq \text{Solution}				
	(To be completed only if the type of shipment is C, D or F)				
	Border crossing point upon entry to the country to which the radioactive waste is				
	shipped				
	Country				
	Border crossing point				
	Date of receipt of the radioactive waste				
	Date when the acknowledgement is sent (together with Section 4 of the standard				
	document)				
	The acknowledgement shall be sent				
	- if the type of shipment is B or E, - to the competent institution of the state of destination of				
	the radioactive waste;				
	- if the type of shipment is C, D or E, - to the applicant of the authorisation.				



	I hereby certify that all the information provided in this document and in the attached documents (if any) is correct and accurate (to the best of my knowledge).			
	Place for a seal			
35.	(signature and full name)			
55.	(To be completed only if the type of shipment is C, D or F)  The applicant of the authorisation (sending the acknowledgement and radioactive waste consignee's declaration to the issuer of the authorisation):			
	Date when the acknowledgement is sent (together with Section 4 of the standard document)			
	Border crossing point upon entry to the country to which the radioactive waste is sent			
	Country			
	Border crossing point			
	Zīmoga vieta			
	(signature and full name)			

#### PS

- 1. If the consignee of the radioactive waste does not utilise this document, his or her declaration shall contain at least the same information as requested in boxes 31 and 35 of this document.
- 2. The competent institution, which has received the acknowledgement, shall send the copies thereof to other involved competent institutions.
- 3. Thereafter Sections 4 and 5 of this document shall be sent to the competent institution, which issued the radioactive waste shipment authorisation.



Note.

<sup>8</sup> This Section shall be completed by the consignee of the radioactive waste, supplementing the information provided by the applicant of the authorisation. The type of acknowledgement shall be chosen in conformity with the type of shipment and the fact whether the authorisation has been granted for a single or several shipments.

### If the authorisation is granted for a single shipment

### 1. Shipments of Type B or E

Within 15 days of receiving of the radioactive waste the consignee of the waste shall complete boxes 31, 32 and 34 of this document and send Sections 4 and 5 of this document to the competent institution of that country to which the radioactive waste has been shipped.

The competent institution of the country where the radioactive waste has been received shall send Sections 4 and 5 of this document to the competent institution, which issued the radioactive waste shipment authorisation, but a copy of Sections 4 and 5 of this document — to other involved competent institutions.

### 2. Shipment of type C, D or F

The consignee of the radioactive waste shall ensure that the consignor after receipt of the radioactive waste freight sends Sections 4 and 5 of this document (with completed boxes 31 and 34) without delay.

Within 15 days of receiving the radioactive waste the applicant of the authorisation shall send Sections 4 and 5 of this document to the competent institution which issued the radioactive waste shipment authorisation.

The competent institution, which issued the radioactive waste shipment authorisation, shall send Sections 4 and 5 of this document to other involved competent institutions.

### If the authorisation is granted for several shipments

### 1. Shipments of type B or E

The consignee of radioactive waste shall after receipt of each shipment complete boxes 31, 32 and 34 of this document and send Sections 4 and 5 of this document to the competent institution of that country to which the radioactive waste is shipped. Prior to that the consignee of radioactive waste shall prepare the necessary number of uncompleted copies of Section 5.

### 2. Shipments of type C, D or F

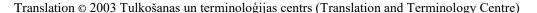
The consignee of radioactive waste shall ensure that the consignor after receipt of each radioactive waste freight sends Sections 4 and 5 of this document (with completed boxes 31 and 34) without delay.

The applicant of the authorisation shall complete box 35 of this document and together with Section 4 of this document send it to the competent institution, which issued the radioactive waste shipment authorisation.

### 3. Radioactive waste shipments of any type

When all authorised radioactive waste shipments have been carried out the last acknowledgement of radioactive waste receipt shall be sent as if the authorisation were granted to a single shipment only, however:

- in box 32 of this document it shall be stated that it is the acknowledgement of the last authorised shipment;
- the notification shall state that all radioactive waste shipments have indeed been received; and
- in order to provide an overview, Section 4 of this document in respect of all shipments, which have been completed, shall be attached.





Minister for	Environmental	Protection	and Regional	Development

V. Makarovs

