

**DECREE OF THE GOVERNMENT OF GEORGIA ON  
"APPROVAL OF TECHNICAL REGULATIONS - RULES FOR TRANSPORT OF NUCLEAR AND  
RADIOACTIVE SUBSTANCES"**

**CHAPTER I. GENERAL PROVISIONS**

**Article 1. OBJECT AND PURPOSE**

1. Technical Regulations - Rules for Transport of Nuclear and Radioactive Substances (hereinafter "Technical Regulations") are aimed at protecting human, property and environment from harmful impact of ionizing radiation during the transportation of nuclear and radioactive substances.
2. The objective of the Technical Regulations is to establish nuclear and radiation safety requirements in the territory of Georgia during transportation of nuclear and radioactive substances.

**Article 2. PRINCIPLES**

Principles of Regulation of Transport of Nuclear and Radioactive Substances:

- a) Prevention of damage to human, property and environment while transporting nuclear and radioactive substances;
- b) Use of graded approach for establishment of requirements based on physical and chemical properties of nuclear and radioactive substances;
- c) Minimize risks while carrying out transportation.

**Article 3. SCOPE OF APPLICATION**

1. The Technical Regulations shall apply to the transportation of nuclear and radioactive substances on the territory of Georgia via land and air conveyances.
2. The Technical Regulations shall not apply:
  - a) to cargo movement on the territory of the nuclear and radiation facility in which it is manufactured, processed, stored or used, if such movement is subject to safety requirements of the nuclear and radiation license holder and is carried out without the shared use of motorcar and / or railway roads;
  - b) during nuclear or radiological emergency and liquidation activities of nuclear or radiological emergency;
  - c) to transportation of nuclear and radioactive substances by the LEPL Agency of Nuclear and Radiation Safety (hereinafter the "Regulatory Body") of the Ministry of Environment and Natural Resources Protection of Georgia;
  - d) to Nuclear or radioactive substance that is an integral part of the means of transport;
  - e) Radioactive material implanted or incorporated into a person or live animal for diagnosis or treatment;
  - f) Radioactive material in or on a person who is to be transported for medical treatment because the person has been subject to accidental or deliberate intake of radioactive material or to contamination.;
  - g) Natural material and ores containing naturally occurring radionuclides specific activity of which after processing are not 10 times higher than that of the calculated values indicated in Table 1 or Table 2 of Appendix 1.

For Natural material and ores containing naturally occurring radionuclides, which are not in the state of secular equilibrium, the specific activity may be determined as follows:

$$X_m = \frac{1}{\sum_i \frac{f(i)}{X(i)}}$$

Where:

*f(i)* is the fraction of activity or activity concentration of radionuclide *i* in the mixture.

*X(i) is the appropriate value of  $A_1$  or  $A_2$ , or the activity concentration limit for exempt material or the activity limit for an exempt consignment as appropriate for the radionuclide  $i$ .*

*$X_m$  is the derived value of  $A_1$  or  $A_2$ , or the activity concentration limit for exempt material or the activity limit for an exempt consignment in the case of a mixture.*

h) Non-radioactive solid objects with radioactive substances present on any surface in quantities not in excess of the levels specified in the definition of contamination.

i) Activities excluded from the regulations provided for by Para. 3, Article 1 of the Law of Georgia on "Nuclear and Radiation Security" and for transportation of generators of ionizing radiation.

3. The European Agreement on International Carriage of Dangerous Goods by Road (ADR) applies to the international transportation of nuclear and radioactive substances via road vehicles.

4. Issues related to the protection of nuclear material are regulated by the Decree of the Minister of Environment and Natural Resources Protection of Georgia "On Physical Security (Protection) of Nuclear and Radiation Objects, Radioactive Sources, Radioactive Wastes and Other Sources of Ionizing Radiation".

5. Transportation of nuclear and radioactive substances via air, also covered by Decree of the Director of LEPL Civil Aviation Agency on "Approval of the Rules for Carriage of Dangerous Goods by Air Transport".

#### **Article 4. DEFINITION OF TERMS**

1. The following definitions shall apply for the purposes of these Regulations:

**a) Special arrangement** – shall mean those provisions, approved by the Regulatory Body, under which consignments that do not satisfy all the applicable requirements of the legislation may be transported.

**b) Low toxicity alpha emitters** - natural uranium, depleted uranium, natural thorium, uranium-235, uranium-238, thorium-232, thorium-228 and thorium-230 when contained in ores or physical and chemical concentrates; or alpha emitters with a half-life of less than 10 days.

**c) Exclusive use** - the sole use, by a single consignor, of a conveyance or of a large freight container, in respect of which all initial, intermediate and final loading and unloading and shipment are carried out in accordance with the directions of the consignor or consignee.

**d) Contamination** - the presence of a radioactive substance on a surface in quantities in excess of 0.4 Bq/cm<sup>2</sup> for beta and gamma emitters and low toxicity alpha emitters, or 0.04 Bq/cm<sup>2</sup> for all other alpha emitters.

**e) Criticality** - The state of a nuclear chain-reacting medium when the chain reaction is just self-sustaining (or critical), i.e. when the reactivity is zero. Often used, slightly more loosely, to refer to states in which the reactivity is greater than zero.

**f) Transport index (TI)** – assigned to a package, overpack or freight container, or to unpackaged LSA-I or SCO-I, shall mean a number that is used to provide control over radiation exposure.

**g) Vehicle/Conveyance** - Land or air transport, used for transportation of nuclear and radioactive substances.

**h) Cargo/Goods** - package or packages or a combination of radioactive material, which is being transported.

**i) Carrier** - Physical or legal person with appropriate authorization under the Law of Georgia on "Nuclear and Radiation Safety", which is authorized to carry out transportation.

**j) Consignor** - Physical or legal person with appropriate authorization under the Law of Georgia on "Nuclear and Radiation Safety", which prepares cargo for transportation and is indicated in the transportation documentation as a consignor.

**k) Consignee** - Physical or legal person with appropriate authorization under the Law of Georgia on "Nuclear and Radiation Safety", which receives cargo and is indicated in the transportation documentation as a consignee.

l) **Transportation** - Includes all actions and conditions related to or used for the movement of radioactive materials: package design, production and maintenance services, as well as preparing, transfer, loading and transporting radioactive material and package, including storage in transit, unloading and reception at the destination.

m) **Criticality Safety Index** - (CSI) assigned to a package, overpack or freight container containing fissile material shall mean a number that is used to provide control over the accumulation of packages, overpacks or freight containers containing fissile material.

2. Other terms used in the present Technical Regulations have the same meaning as in the Georgian legislation.

#### **Article 5. CRITICALITY SAFETY INDEX (CSI)**

1. The CSI for each overpack or freight container shall be determined as the sum of the CSIs of all the packages contained. The same procedure shall be followed for determining the total sum of the CSIs in a consignment or aboard a conveyance.

2. The CSI should not exceed the values given in Appendix 10.

3. Except for consignments under exclusive use, the TI of any package or overpack shall not exceed 10, nor shall the CSI of any package or overpack exceed 50.

4. For overpacking or freight container, the label shall indicate the sum CSIs for the package it contains.

#### **Article 6. LIMITING DISTANCE AND EFFECTIVE DOSE**

1. The distance between the packages, overpacks and freight containers and the individuals engaged in transportation shall be at the maximum possible, depending on the conveyance and taking into account the principle of optimization of exposure to radiation.

2. The effective dose envisaged for population during transportation is 1 mSv / h, and for workers - 20 mSv / h averaged for five years.

#### **Article 7. UNITED NATIONS FOUR-DIGIT NUMBER**

1. The radioactive substance provided for transportation shall be assigned with four-digit number of the United Nations and the relevant number of transportation (*Appendix 2*).

2. Assignment of the UN specific four-digit number shall be made in accordance with the requirements of the radionuclide activity, fissionability and the non-fissionability, packaging type, packaging contents, form and characteristics of the packaging, as well as the requirements for specific transportation.

#### **Article 8. DETERMINATION OF TRANSPORT INDEX (TI)**

1. Transport index shall be calculated in accordance with the following procedure:

s) Determine the maximum radiation level in units of millisieverts per hour (mSv/h) at a distance of 1 m from the external surfaces of the package, overpack, freight container or unpackaged LSA-I and SCO-I. The value determined shall be multiplied by 100 and the resulting number is the TI. For uranium and thorium ores and their concentrates, the maximum radiation level at any point 1 m from the external surface of the load may be taken as:

a.a) 0.4 mSv/h for ores and physical concentrates of uranium and thorium;

a.b) 0.3 mSv/h for chemical concentrates of thorium;

a.c) 0.02 mSv/h for chemical concentrates of uranium, other than uranium hexafluoride.

(b) For tanks, freight containers and unpackaged LSA-I and SCO-I, the value determined in paragraph (a) shall be multiplied by the appropriate factor from Annex 9.

(c) The value obtained in paragraphs (a) and (b) shall be rounded up to the first decimal place (for example, 1.13 becomes 1.2), except that a value of 0.05 or less may be considered as zero.

2. The TI for each overpack, freight container or conveyance shall be determined as either the sum of the TIs of all the packages contained, or by direct measurement of radiation level, except in the case of non-rigid overpacks, for which the TI shall be determined only as the sum of the TIs of all the packages.
3. Any package or overpacking the transport index of which exceeds 10, shall be transported only under the exclusive use.

**Article 9. TRANSPORT OF RADIOACTIVE SUBSTANCES WITH OTHER GOODS**

1. A package shall not contain any items other than those that are necessary for the use of the radioactive material. The interaction between these items and the package, under the conditions of transport applicable to the design, shall not reduce the safety of the package.
2. Radioactive substances as consignments shall be segregated from other dangerous goods during transport in compliance with the relevant transport regulations for dangerous goods.
3. In addition to the radioactive and fissile properties, any other dangerous properties of the contents of the package, such as explosiveness, flammability, pyrophoricity, chemical toxicity and corrosiveness, shall be taken into account in the packing, labelling, marking, placarding, storage and transport.

**CHAPTER II. REQUIREMENTS FOR RADIOACTIVE SUBSTANCES BY CATEGORIES**

**Article 10. CATEGORIES OF RADIOACTIVE SUBSTANCES**

For transport purposes, radioactive substances are divided into the following categories:

- a) LSA (low specific activity material);
- b) SCO (Surface contaminated object);
- c) Special form radioactive material;
- d) Low dispersible radioactive material;
- e) Fissile material.

**Chapter 11. VALUES OF RADIOACTIVE SUBSTANCES INTENDED FOR TRANSPORTATION**

1.  $A_1$  and  $A_2$  values are used to describe radioactive substances:
  - a)  $A_1$  value defines activity limit for special form radioactive material;
  - b)  $A_2$  value is applied to define activity limit of radioactive material (except for the special form radioactive material).
2. The appropriate value for the mixture is calculated using the following formula:

$$A_m = \frac{1}{\sum_i \frac{g(i)}{A(i)}}$$

where,  $A_m$  is a sum value,  $g(i)$  – specific proportion of  $i$  radionuclide by mass in mixture, and  $A(i)$  – relevant activity of  $i$  radionuclide.

3. The values of unknown radionuclides are determined by Table 2.

**Article 12. LSA (LOW SPECIFIC ACTIVITY MATERIAL)**

1. LSA (Low specific activity material) is radioactive material that by its nature has a limited specific activity, or radioactive material for which limits of estimated average specific activity apply.
2. LSA material shall be in one of three groups:
  - a) LSA-I:
    - a.a) Uranium and thorium ores and concentrates of such ores, and other ores containing naturally occurring radionuclide;

- a.b) Natural uranium, depleted uranium, natural thorium or their compounds or mixtures, that are unirradiated and in solid or liquid form;
  - a.c) Radioactive material for which the A2 value is unlimited. Fissile material may be included only if it is allowed under the current legislation.
  - a.d) Other radioactive material in which the activity is distributed throughout and the estimated average specific activity does not exceed 30 times the values for the activity concentration specified in Table 1 and Table 2 of Annex 1.
- b) LSA-II:
- b.a) Water with a tritium concentration of up to 0.8 TBq/L;
  - b.b) Other material in which the activity is distributed throughout and the estimated average specific activity does not exceed  $10^{-4}A_2/g$  for solids and gases, and  $10^{-5}A_2/g$  for liquids.
- c) LSA-III - Solids (e.g. consolidated wastes, activated materials), excluding powders, of such a nature that if the entire contents of a package were subjected to the test specified, the activity in the water would not exceed  $0.1A_2$  in which:
- (c.a) The radioactive material is distributed throughout a solid or a collection of solid objects, or is essentially uniformly distributed in a solid compact binding agent (such as concrete, bitumen and ceramic).
  - (c.b) The radioactive material is relatively insoluble, or is intrinsically contained in a relatively insoluble matrix, so that, even under loss of packaging, the loss of radioactive material per package by leaching when placed in water for 7 days would not exceed  $0.1A_2$ .
  - (c.c) The estimated average specific activity of the solid, excluding any shielding material, does not exceed  $2 \times 10^{-3}A_2/g$ .
3. A single package of non-combustible solid LSA-II or LSA-III material, if carried by air, shall not contain an activity greater than  $3000A_2$ .
4. The radioactive contents in a single package of LSA material shall be so restricted that the external radiation level at 3 m from the unpacked material or object or collection of objects does not exceed 10 mSv/h.

### **Article 13. SURFACE CONTAMINATED OBJECT (SCO)**

Surface contaminated object (SCO) shall mean a solid object that is not itself radioactive but which has radioactive material distributed on its surface. SCO shall be divided into two groups:

- a) SCO-I: A solid object on which:
  - a.a) The non-fixed contamination on the accessible surface averaged over  $300 \text{ cm}^2$  (or the area of the surface if less than  $300 \text{ cm}^2$ ) does not exceed  $4 \times 10^4 \text{ Bq/cm}^2$  for beta and gamma emitters and low toxicity alpha emitters, or  $0.4 \text{ Bq/cm}^2$  for all other alpha emitters;
  - a.b) The fixed contamination on the accessible surface averaged over  $300 \text{ cm}^2$  (or the area of the surface if less than  $300 \text{ cm}^2$ ) does not exceed  $4 \times 10^4 \text{ Bq/cm}^2$  for beta and gamma emitters and low toxicity alpha emitters, or  $4 \times 10^3 \text{ Bq/cm}^2$  for all other alpha emitters;
  - a.c) The non-fixed contamination plus the fixed contamination on the inaccessible surface averaged over  $300 \text{ cm}^2$  (or the area of the surface if less than  $300 \text{ cm}^2$ ) does not exceed  $4 \times 10^4 \text{ Bq/cm}^2$  for beta and gamma emitters and low toxicity alpha emitters, or  $4 \times 10^3 \text{ Bq/cm}^2$  for all other alpha emitters;
- b) SCO-II: A solid object on which either the fixed or non-fixed contamination on the surface exceeds the applicable limits specified in (a) subparagraph above and on which:
  - b.a) The non-fixed contamination on the accessible surface averaged over  $300 \text{ cm}^2$  (or the area of the surface if less than  $300 \text{ cm}^2$ ) does not exceed  $400 \text{ Bq/cm}^2$  for beta and gamma emitters and low toxicity alpha emitters, or  $40 \text{ Bq/cm}^2$  for all other alpha emitters;
  - b.b) The fixed contamination on the accessible surface averaged over  $300 \text{ cm}^2$  (or the area of the surface if less than  $300 \text{ cm}^2$ ) does not exceed  $8 \times 10^5 \text{ Bq/cm}^2$  for beta and gamma emitters and low toxicity

alpha emitters, or  $8 \times 10^4$  Bq/cm<sup>2</sup> for all other alpha emitters;

b.c) The non-fixed contamination plus the fixed contamination on the inaccessible surface averaged over 300 cm<sup>2</sup> (or the area of the surface if less than 300 cm<sup>2</sup>) does not exceed  $8 \times 10^5$  Bq/cm<sup>2</sup> for beta and gamma emitters and low toxicity alpha emitters, or  $8 \times 10^4$  Bq/cm<sup>2</sup> for all other alpha emitters.

#### **Article 14. SPECIAL FORM RADIOACTIVE MATERIAL**

Special form radioactive material shall mean either an indispersible solid radioactive material or a sealed capsule containing radioactive material. Radioactive material shall meet the following criteria to be considered a special form radioactive material:

- a) Special form radioactive material shall have at least one dimension of not less than 5 mm;
- b) When a sealed capsule constitutes part of the special form radioactive material, the capsule shall be so manufactured that it can be opened only by destroying it.

#### **Article 15. LOW DISPERSIBLE RADIOACTIVE MATERIAL**

Low dispersible radioactive material shall mean either a solid radioactive material or a solid radioactive material in a sealed capsule, that has limited dispersibility and is not in powder form. Radioactive material may be classified as low dispersible radioactive material only if the radiation level at 3 m from the unshielded radioactive material does not exceed 10 mSv/h.

#### **Article 16. FISSILE MATERIAL**

1. Fissile materials are Uranium-233, Uranium-235, Plutonium-239, Plutonium-241 or any combination of the named radionuclides.

2. Natural uranium or depleted uranium and natural uranium or depleted uranium that has been irradiated in thermal reactors are not considered as fissile material.

### **CHAPTER III. PACKAGING OF RADIOACTIVE MATERIAL**

#### **Article 17. TYPES AND CATEGORIES OF PACKAGES**

1. Only the following types of packages may be used for transport of radioactive substances:

- a) Excepted package;
- b) Industrial package (types IP-1, IP-2, IP-3);
- c) Type A package;
- d) Type B package;
- e) Type C package.

2. Package or overpacks shall be assigned with one of the following categories:

- a) I - WHITE;
- b) II - YELLOW;
- c) III - YELLOW.

#### **Article 18. ASSIGNING CATEGORIES TO PACKAGE AND OVERPACKS**

Packages and overpacks shall be assigned to the categories in accordance with the conditions specified in Para.2 of Article 17 and with the following requirements:

- a) TI and the surface radiation level shall be taken into account;
- b) Where the TI corresponds for one category, but the surface radiation level corresponds a different category, the package or overpack shall be assigned to the higher category. For this purpose, category I-WHITE shall be regarded as the lowest category.
- c) If the surface radiation level is greater than 2 mSv/h, the package or overpack shall be transported under exclusive use or as a special arrangement;

- d) A package transported under a special arrangement shall be assigned to category III-YELLOW.
- e) An overpack that contains packages transported under special arrangement shall be assigned to category III-YELLOW.

#### **Article 19. GENERAL REQUIREMENTS FOR PACKAGES**

1. Package should not contain radioactive substances activity, form, physical and chemical condition or radionuclide composition of which differs from the acceptable values for these specific packages.
2. Package design shall meet the following requirements:
  - a) The package shall be so designed in relation to its mass, volume and shape that it can be easily and safely transported;
  - b) Its protection shall be ensured during transportation in, or on the conveyance;
  - c) The design shall be such that any lifting attachments on the package will not fail when used in the intended manner and that if failure of the attachments should occur;
  - d) Attachments and any other features on the outer surface of the package that could be used to lift it shall be designed to support its mass or shall be removable or otherwise rendered incapable of being used during transport;
  - e) As far as practicable, the outer layer of the package shall be so designed as to prevent the collection and the retention of water;
  - f) Any features added to the package at the time of transport that are not part of the package shall not reduce its safety;
  - g) The package shall be capable of withstanding the effects of any acceleration, vibration or vibration resonance that may arise under routine conditions of transport without any deterioration. In particular, nuts, bolts and other securing devices shall be so designed as to prevent them from becoming loose or being released unintentionally, even after repeated use;
  - h) The design of the package shall take into account ambient temperatures and pressures that are likely to be encountered in routine conditions of transport;
  - i) Package design should take into account other additional risks, which may be characteristics of radioactive material;
  - j) Package should be so designed that the outside surface does not contain any joints and can easily be decontaminated;
  - k) Interaction between the package material, any component and structure (physical and chemical characteristics) and with radioactive substances should be taken into account;
3. Volume of radioactive material in the package should not exceed specific limit for specific package as determined by the present Technical Regulations.
4. Radioactive material may be transported in a higher protection package than is required for specific radioactive material.

#### **Article 20. REQUIREMENTS FOR THE EXCEPTED PACKAGES**

1. A package may be classified as an excepted package if it meets the following conditions:
  - a) It is an empty package having contained radioactive material;
  - b) It contains instruments or articles not exceeding the activity limits specified in Table 4;
  - c) It contains articles manufactured of natural uranium, depleted uranium or natural thorium;
  - d) It contains radioactive material not exceeding the activity limits specified in Table 4;
2. The radiation level from any point on the external surface is not greater than 5 mSv/h.
3. The radioactive substance transported in excepted packages, which is the part of the device or other industrial item\*, shall additionally meet the following provisions:
  - a) The radiation level at 10 cm from any point on the external surface of any unpackaged instrument or article is not greater than 0.1 mSv/h;

- b) The radioactive material shall be completely enclosed by non-active components.
- 4. It is not mandatory to place radiation label and placard on the exterior surface of the excepted packages. The appropriate sign should be placed on the internal surface of the package.
- 5. Excepted packages may be transported via passenger transport and post.

*\* Note: a device performing the sole function of containing radioactive material shall not be considered to be an instrument or manufactured article.*

**Article 21. TRANSPORT OF LSA AND SCO MATERIAL**

- 1. LSA-I and SCO-I may be transported, unpackaged, under the following conditions:
  - a) All unpackaged material other than ores containing only naturally occurring radionuclides shall be transported in such a manner that under routine conditions of transport there will be no escape of the radioactive contents from the conveyance nor will there be any loss of shielding;
  - b) Each conveyance shall be under exclusive use, except when only transporting SCO-I on which the contamination on the accessible and the inaccessible surfaces is not greater than 10 times the applicable level specified in the definition of contamination;
  - c) For SCO-I where it is suspected that non-fixed contamination exists on inaccessible surfaces in excess of the values specified in para. (a)(a) , Article 13 of the Technical Regulations, measures shall be taken to ensure that the radioactive material is not released into the conveyance;
  - d) Fissile material shall be transported under exclusive use in a consignment with no more than 45 g of fissile nuclides.
- 2. In any other cases, LSA material and SCO shall be packaged in accordance with *Annex 5*.

**Article 22. REQUIREMENTS FOR INDUSTRIAL PACKAGES**

The quantity of LSA material or SCO in a single Type IP-1, Type IP-2, Type IP-3 package shall be so restricted that the external radiation level at 3 m from the unshielded material or object or collection of objects does not exceed 10 mSv/h.

**Article 23. REQUIREMENTS FOR TYPE A PACKAGES**

Type A packages shall not contain activities greater than either of the following:

- a) For special form radioactive material-  $A_1$ ;
- b) For all other radioactive material-  $A_2$ .
- c) For mixtures of radionuclides whose identities and respective activities are known,

$$\sum_i \frac{B(i)}{A_1(i)} + \sum_j \frac{C(j)}{A_2(j)} \leq 1$$

where:

*B(i) is the activity of radionuclide i as special form radioactive material;*

*A<sub>1</sub>(i) is the A<sub>1</sub> value for radionuclide i;*

*C(j) is the activity of radionuclide j as other than special form radioactive material;*

*A<sub>2</sub>(j) is the A<sub>2</sub> value for radionuclide j.*

**Article 24. REQUIREMENTS RELATING TO TRANSPORT BY AIR**

- 1. Type B(M) packages and consignments under exclusive use shall not be transported on passenger aircraft.
- 2. Vented Type B(M) packages, packages that require external cooling by an ancillary cooling system, packages subject to operational controls during transport and packages containing liquid pyrophoric materials shall not be transported by air.



3. Packages or overpacks having a surface radiation level greater than 2 mSv/h shall not be transported by air except by special arrangement under the legislation.

4. For transport by air, B(U) and B(M) type packages shall not contain activity higher than the activities listed below:

- a) For Special form radioactive material -  $3000A_1$  or  $10^5A_2$ , whichever is the lower;
- b) For all other radioactive material -  $3000A_2$ .

#### **Article 25. TRANSPORTATION UNDER EXCLUSIVE USE**

For consignments under exclusive use, the radiation level shall not exceed:

a) 10 mSv/h at any point on the outer surface of any package or overpack, and may only exceed 2 mSv/h provided that:

a.a) The vehicle is equipped with an enclosure that, during routine conditions of transport, prevents the access of unauthorized persons to the interior of the enclosure;

a.b) Provisions are made to secure the package or overpack so that its position within the vehicle enclosure remains fixed during routine conditions of transport;

a.c) There is no loading or unloading during the shipment.

b) 2 mSv/h at any point on the outer surfaces of the vehicle, including the upper and lower surfaces, or, in the case of an open vehicle, at any point on the vertical planes projected from the outer edges of the vehicle, on the upper surface of the load, and on the lower external surface of the vehicle.

c) 0.1 mSv/h at any point 2 m from the vertical planes represented by the outer lateral surfaces of the vehicle, or, if the load is transported in an open vehicle, at any point 2 m from the vertical planes projected from the outer edges of the vehicle.

### **Chapter IV. MARKING, LABELLING AND PLACARDING**

#### **Article 26. GENERAL RULES FOR MARKING**

1. For each package or overpack, the UN four digit number and proper shipping name shall be determined (*Annex 2*).

2. Each package shall be legibly and durably marked on the outside of the packaging with an identification of either the consignor or consignee, in compliance with the UN marking. (*Annex 6*).

4. Each package of gross mass exceeding 50 kg shall have its permissible gross mass legibly and durably marked on the outside of the packaging.

#### **Article 27. MARKING BY TYPES OF PACKAGES**

1. For unpacked LSA-I or SCO-I material, the outer surface shall bear the marking "RADIOACTIVE LSA-I" and/or "RADIOACTIVE SCO-I", as appropriate.

2. All types of packages (except for excepted) - outer surface should be marked by the four-digit code of the United Nations and:

a) For industrial package - "TYPE IP-1", "TYPE IP-2" and "TYPE IP-3", accordingly;

b) For A Type package - "TYPE A";

c) For B(U) Type package - "TYPE B(U)";

d) For B(M) Type package - "TYPE B(M)";

e) For C Type package - "TYPE C".

#### **Article 28. GENERAL RULE FOR LABELLING**

1. It is not required to label excepted packages.

2. Labeling is required for packages and overpacks of the categories referred to in Article 17, paragraph 2 of the present Technical Regulations.

3. The label must be placed on packages and overpacks in accordance with the Rules for Transportation of Cargo via Motor Vehicles of the Technical Regulations.
4. Any labels that do not relate to the contents shall be removed or covered.
5. The labels shall be affixed to two opposite sides of the outside of a package or overpack or on the outside of all four sides of a freight container or tank.

#### **Article 29. INFORMATION ON THE LABEL**

1. Package label shall contain the following information:
  - a) Contents: Except for LSA-I material, the name(s) of the radionuclide(s) as using the symbols prescribed. For mixtures of radionuclides, the most restrictive nuclides must be listed to the extent the space on the line permits. The group of LSA or SCO shall be shown following the name(s) of the radionuclide(s). The terms “LSA-II”, “LSA-III”, “SCO-I” and “SCO-II” shall be used for this purpose. For LSA-I material, the term “LSA-I” is all that is necessary; the name of the radionuclide is not necessary.
  - b) Activity: The maximum activity of the radioactive contents during transport expressed in units of becquerels (Bq) with the appropriate SI prefix symbol (see Annex II). For fissile material, the total mass of fissile nuclides in units of grams (g), or multiples thereof, may be used in place of activity.
  - c) For overpacks and freight containers, the “contents” and “activity” entries on the label shall bear the information on summed activity of the contents, respectively, totalled together for the entire contents of the overpack or freight container except that on labels for overpacks or freight containers containing mixed loads of packages containing different radionuclides, such entries may read “See Transport Documents”.
  - d) TI: The number determined in accordance with the Technical Regulation. No TI entry is required for Category I-WHITE.

#### **Article 30. PLACARDING**

1. Freight containers carrying radioactive substances shall bear placards that conform to the model given in Annex 7.
2. The placards shall be affixed to each side wall of the freight container or tank, and for vehicle – at the back in addition.
3. Instead of using both labels and placards, it is permitted, to use labels only, if their dimensions are compatible with those shown in *Annex 7*.

#### **Article 31. ADDITIONAL REQUIREMENTS RELATED TO TRANSPORT BY RAIL AND BY ROAD**

Rail and road vehicles carrying packages, overpacks or freight containers labelled with any of the labels specified in Technical Regulation on Shipment of Freight Containers, or carrying consignments under exclusive use, shall display the placard shown in Annex 7 on each of:

- a) The two external lateral walls in the case of a rail vehicle;
  - b) The two external lateral walls and the external rear wall in the case of a road vehicle.
2. In the case of a vehicle without sides, the placards may be affixed directly on the cargo carrying unit provided that they are readily visible. In the case of large tanks or freight containers, the placards on the tanks or freight containers shall suffice.
  3. In the case of vehicles that have insufficient area to allow the fixing of larger placards, the dimensions of the placard described in Annex 7 may be reduced to 100 mm.
  4. Any placards that do not relate to the contents shall be removed.

### **Article 32. CONTAMINATION CHECK**

1. A conveyance used for transportation shall be equipped with a portable radiometer, PPE and location indicating device.
2. A conveyance and equipment used regularly for the transport of radioactive material shall be periodically checked by a Consignor to determine the level of contamination.
3. The frequency of such checks shall be determined by the likelihood of contamination and the extent to which radioactive material is transported.

### **Article 33. DECONTAMINATION**

1. Any conveyance, or equipment or part thereof that shows a radiation level in excess of 5  $\mu\text{Sv/h}$  at the surface, shall be decontaminated as soon as possible by an authorized qualified person of a Consignor.
2. Contaminated conveyance, or equipment shall not be reused unless non-fixed contamination on the external surfaces of any package is kept as low as practicable and does not exceed the following limits (4  $\text{Bq/cm}^2$  for beta and gamma emitters and low toxicity alpha emitters, and 0.4  $\text{Bq/cm}^2$  for all other alpha emitters), and the radiation level resulting from the fixed contamination does not exceed 5  $\mu\text{Sv/h}$  at the surface.
3. Any conveyance, package, or overpack used for transport of radioactive material shall not be used for storage or transportation of other goods unless it is decontaminated (0.4  $\text{Bq/cm}^2$  for beta and gamma emitters and low toxicity alpha emitters, and 0.04  $\text{Bq/cm}^2$  for all other alpha emitters).

### **Article 34. DAMAGED PACKAGE**

1. If it is evident that a package is damaged or leaking, or if it is suspected that the package may have leaked or been damaged, access to the package shall be restricted and a qualified person of a consignor shall, as soon as possible, assess the extent of contamination and the resultant radiation level of the package.
2. The scope of the assessment shall include the package, the conveyance, the adjacent loading and unloading areas and, if necessary, all other material that has been carried in the conveyance.
3. When necessary, additional steps for the protection of persons, property and the environment, in accordance with provisions established by the current legislation shall be taken to overcome and minimize the consequences of such leakage or damage.
4. Packages that are damaged or leaking radioactive contents in excess of allowable limits for normal conditions of transport may be removed to an acceptable interim location under supervision, but shall not be forwarded until repaired or reconditioned and decontaminated.

### **Article 35. SEGREGATION DURING TRANSPORT AND STORAGE IN TRANSIT**

1. Packages, overpacks and freight containers containing radioactive material and unpackaged radioactive material shall be segregated during transport and during storage in transit:
  - a) From workers in regularly occupied working areas by distances calculated using a dose criterion of 5 mSv in a year and conservative model parameters;
  - b) From members of the public in areas where the public has regular access by distances calculated using a dose criterion of 1 mSv in a year and conservative model parameters;
  - c) From undeveloped photographic film by distances calculated using a radiation exposure criterion for undeveloped photographic film due to the transport of radioactive material of 0.1 mSv per consignment of such film.
2. Category II-YELLOW or III-YELLOW packages or overpacks shall not be carried in compartments occupied by passengers, except those exclusively reserved for couriers specially authorized to accompany such packages or overpacks.

3. Consignments shall be securely stowed among packaged general cargo without any special stowage provisions provided that:

- a) Packages and overpacks are not easily flammable (average surface heat flux does not exceed 15 W/m<sup>2</sup>);
- b) Immediate surrounding cargo is not in sacks or bags;
- c) Consignor has not defined special conditions for stowage.

4. Any group of packages, overpacks and freight containers containing fissile material stored in transit in any one storage area shall be so limited that the sum of the CSIs in the group does not exceed 50. Each group shall be stored so as to maintain a spacing of at least 6 m from other such groups.

5. Where the sum of the CSIs on board a conveyance or in a freight container exceeds 50, storage shall be such as to maintain a spacing of at least 6 m from other groups of packages, overpacks or freight containers containing fissile material or other conveyances carrying radioactive material.

#### **Article 36. UNDELIVERABLE CONSIGNMENTS**

Where a consignment is undeliverable, it shall be placed in a safe location and the appropriate competent regulatory authority shall be informed.

### **Chapter VI. RESPONSIBILITIES OF THE REGULATORY BODY AND THE CONSIGNOR**

#### **Article 37. RESPONSIBILITIES OF THE REGULATORY BODY**

1. The Regulatory Body shall conduct appropriate inspection of nuclear and radiation activity on the basis of the decision of the Regulatory Body during transportation and / or on the facility of the relevant Consignor to ensure on-site assessment of the protection activities, including technical, procedural and administrative measures.

2. Inspection by the Regulatory Body shall not inadequately interfere with or influence the course of transportation.

3. In the process of inspection of appropriate nuclear or radiation activity, the Regulatory Body shall inspect that:

- a) Radiation protection program is in compliance with the threats related to the performed activities;
- b) Protection and safety is optimized in order that the magnitude of individual doses, the number of persons exposed and the likelihood of incurring exposure is kept as low as reasonably achievable (economic and social factors being taken into account);
- c) Employees are provided with adequate training and necessary information;
- d) Formal measures are taken to ensure periodic review of radiation protection aspects.

#### **Article 38. PREREQUISITES FOR TRANSPORTING OPERATORS FOR CONSIGNORS**

1. Consignor is entitled to send goods provided that:

- a) He has a proper authorization from the Regulatory Body;
- b) Goods are placed in the package in accordance with the requirements of this Technical Regulations;
- c) Conveyance meets the requirements set by the applicable legislation;
- d) Documentation specified by the present Technical Regulations is delivered to the Driver or Carrier;
- e) Requirements related to safety during transportation set by the applicable legislation are safeguarded.

2. Carrier is entitled to perform transportation provided that:

- a) He has a proper authorization in accordance with the applicable legislation;
- b) Condition of the conveyance meets the requirements established by legislation;
- c) Goods are placed in the package in accordance with the requirements of this Technical Regulations;

#### **Article 39. RESPONSIBILITIES OF THE CONSIGNOR**

1. The Consignor shall be responsible for limiting the exposure dosage of employees, optimization of security and safety, development and implementation of appropriate radiation protection program.

2. Where it is assessed that the effective dose either:
  - a) Is likely to be between 1 and 6 mSv in a year, consignor shall perform workplace monitoring or individual dose monitoring;
  - b) Is likely to exceed 6 mSv in a year, consignor shall perform individual dose monitoring.
3. When individual dose monitoring or workplace monitoring is conducted, appropriate records shall be kept.
4. Carrier shall ensure safe transportation of goods during transportation.
5. Consignor shall send the transportation documentation and instructions to the Carrier.
6. When transporting nuclear material, a physical person carrying the cargo is responsible for continuous monitoring. The driver must control conveyance prior to transportation, after each stop (planned and unplanned) and upon arriving at the destination.
7. Carrier shall bear primary responsibility for the safety of nuclear material.
8. Consignee's responsibilities are:
  - a) Not to procrastinate receipt of goods;
  - b) If necessary, clean and decontaminate the conveyance, and remove placard, marking and labels from the conveyance after its cleaning, degasation and decontamination.
  - c) Unload the goods only in a special location designed for unloading;
  - d) Take into account other safety measures;
  - e) Prepare the goods-related safety measures and provide the appropriate personnel for receipt of the nuclear material in the predetermined time and location;
  - f) Inform the Consignor on the receipt of undamaged packaging. In case if packages are lost or damaged, the Consignee shall immediately notify the Regulatory Body and other authorized agencies.
9. In case of loss of goods, the Operator shall take all measures permitted by law to seek the missing goods and immediately inform the Patrol Police and the Regulatory Body on the loss of the cargo and the existing threats.

#### **Article 40. DRIVER'S RESPONSIBILITIES**

1. Only a person above 21 years holding a relevant driver's license is allowed to be a driver of a conveyance for transport of nuclear and radioactive material.
2. The driver may carry out transportation if:
  - a) the instructions and transportation characteristics have been introduced to him;
  - b) Conveyance and goods are compatible with applicable legislation;
  - c) The rule prescribed by the present Technical Regulations for marking, labeling and placarding is followed;
  - d) He has been provided with the necessary documentation and additional equipment in accordance with the present Technical Regulations.

#### **Article 41. REQUIREMENTS FOR TRANSPORT DOCUMENTATION**

The consignor shall develop and include in the transport documents with each consignment that should specify the following information in addition to that under the current legislation:

- a) The identification of the consignor and consignee, including their names and addresses;
- b) Name of means of transport;
- c) The UN four digit number assigned to the material as specified in accordance with the Technical Regulations;
- d) The proper shipping name, as specified in accordance with the Technical Regulations;
- e) The UN class number "7" for hazardous cargo;

- f) A description of the physical and chemical form of the material, or a notation that the material is special form radioactive material or low dispersible radioactive material. A generic chemical description is acceptable for chemical form;
- g) The maximum activity of the radioactive contents during transport expressed in units of becquerels (Bq) with the appropriate SI prefix symbol;
- h) The category of the package;
- i) The TI - categories II-YELLOW and III-YELLOW only;
- j) A certified copy of a license or permit issued by the Regulatory Body;
- k) For consignments of more than one package, the information provided above shall be given for each package separately;
- l) Where a consignment is required to be shipped under exclusive use, the corresponding statement shall exist in the documentation;
- m) For LSA-II, LSA-III, SCO-I and SCO-II, the total activity of the consignment as a multiple of  $A_2$ . (For radioactive material for which the  $A_2$  value is unlimited, the multiple of  $A_2$  shall be zero).

#### **Article 42. CONSIGNOR'S DECLARATION**

1. The consignor shall include in the transport documentation a declaration in the following terms: "I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport in accordance with the applicable legislation."
2. The declaration shall be signed and dated by the authorized person of the consignor.

#### **Article 43. RADIATION PROTECTION INSTRUCTIONS**

1. The Operator shall develop the Radiation Protection Instructions for transporting nuclear and radioactive material.
2. The Operator shall ensure that the above-mentioned Instructions are always available in a conveyance at the time of transportation of nuclear and radioactive material and that the Driver is aware of the contents of the Instructions and the relevant actions taken during emergency.
3. The Instructions shall contain:
  - a) Optimization principles and dosage limit for the employees;
  - b) Goods segregation and storage requirements during transportation;
  - c) Response activities in case of emergency;
  - d) Supplementary requirements for loading, stowage, carriage, handling and unloading of the package, overpack or freight container, including any special stowage provisions for the safe dissipation of heat, or a statement that no such requirements are necessary.

### **Chapter VII. TRAINING OF THE EMPLOYEES**

#### **Article 44. REQUIREMENTS FOR TRAINING OF THE EMPLOYEES**

1. The Operator is responsible to provide individuals involved in the transportation of nuclear and radioactive material with the following categories of trainings:
  - a) General awareness training;
  - b) Function specific training;
  - c) Safety training including emergency response training.
2. General awareness training includes the following:
  - a) Training for any person involved in the transportation of nuclear and radioactive material in the field of the applicable general requirements related to transport of radioactive material;
  - b) Such training shall include a description of the categories of radioactive material; labelling, marking, placarding and packaging and segregation requirements; a description of the purpose and content of

the radioactive material transport document; and a description of available emergency response documents.

3. For function specific training - each person shall receive detailed training concerning specific radioactive material transport requirements that are applicable to the function that person performs.

4. For safety training: Commensurate with the risk of exposure in the event of a release and the functions performed, each person shall receive training on:

a) Methods and procedures for accident avoidance, such as proper use of package handling equipment and appropriate methods of stowage of radioactive material;

b) Available emergency response information and how to use it;

c) General dangers presented by the various categories of radioactive material and how to prevent exposure to those hazards, including, if appropriate, the use of personal protective clothing and equipment;

d) Immediate procedures to be followed in the event of an unintentional release of radioactive material, including any emergency response procedures for which the person is responsible and personal protection procedures to be followed.

5. The Operator is responsible to employ a person for the position related to transporting nuclear and radioactive material who has undertaken trainings referred to in paragraphs 1-4 of this Article and / or to provide him with the trainings referred to in paragraphs 1-4 of this Article upon employment.

6. The Operator is responsible to provide periodic retraining of persons involved in the transportation of nuclear and radioactive materials in the aspects referred to in paragraphs 2-4 of this Article.

7. Function specific training subjects are defined in Appendix 8.