MINISTRY OF SCIENCE AND TECHNOLOGY --- No. 14/2003/TT-BKHCN	THE SOCIALIST REPUBLIC OF VIETNAM **Independence-Freedom- Happiness** *Ha Noi, July 11th 2003*

CIRCULAR

On Safe transport of radioactive material

Pursuant to the Ordinance on Radiation Safety and Control dated on June 25, 1996;

Pursuant to the Decree No. 50/1998/ND-CP isued by the Government dated on July 16, 1998, detailing the Implementation of the Ordinance on Radiation Safety and Control and the Decree No. 13/2002/ND-CP isued by the Governement, dated on February 19, 2003, specified a List of dangerous goods and transportation of the dangerous goods by land.

Pursuant to the Decree No. 54/2003/ND-CP issued by the Government dated on May 19, 2003, specified Mission, Functions, Powers and Organisation Structure of the Ministry of Science and Technology.

The Ministry of Science and Technology issues this guides on the safe transport of radioactive materials as follows:

I. GENERAL PROVISIONS

1. Subjects and scope of application

1.1. This Circular applies to organisations, individuals involved in the transportation of solid, liquid, gas radioactive substances and wastes (hereinafter referred to as radioactive materials) by land, ship and air within Vietnam's territory.

1.2. This Circular does not apply to the transport of

a) Fissile material, nuclear fuel;

b) Radioactive materials within installations.

c) Permitted consumer products containing radioactive materials.

d) Radioactive materials that their the specific activity is lower than that of exempted radioactive materials or their total activity is lower than that of an exempted consignment. The specific activity of an exempted radioactive material and activity limit of an exempted consignment are given in Columns 4, 5 of Table 1, Table 2 of Vietnam Standards TCVN 6867-1:2001 'Radiation Safety – Safe Transportation of Radioactive Materials – Part 1: General Provisions (hereinafter referred to as TCVN 6868-1:2001).

2. Definitions

In addition to the terms explained in TCVN 6867-1:2001, for the purpose of this Circular, the following terms shall be defined as follows:

2.1. **Transport of radioactive material** means a process consisting of activities and condistions associated with and involved in the movement of radioactive substances; these include the design, manufacture, maintenance of packaging, and the preparation, packaging, transportstion, protection and receipt of the radioactive material at the final destination, and packages in normal conditions as well as in the event of incidents, accidents.

2.2. **A1 and A2**

A1 is the activity of special form of radioactive material and used to determine the activity limits of the special radioactive material in radioactive packages permitted to be transported. A1 values are given in the Column 2 Table 1, Column 2 Table 2 of TCVN 6867-1:2001.

A2 is the activity of radioactive material, other than the special form of radioactive material, and used to determine the activity limits of the radioactive material, other than the special radioactive material, in radioactive packages permitted to be transported. A2 values are given in the Column 3 Table 1, Table 2 of TCVN 6867-1:2001.

2.3. **Specific activity of radioactive nucleus**

Specific activity of a radioactive nucleus is the activity per weight of that radioactive nucleus. If the radioactive substance is dispersed in the material, the specific activity shall be the activity per weight of that material. The unit is Becquerel/gram (Bq/g).

2.4. **Low hazardous alpha emitters** are natural uranium, depleted uranium, natural thorium, ores or concentrates containing uranium-235, uranium-238, thorium-232, thorium-228, thorium-230 or alpha emitters with half-life of less than 10 days.

2.5. **The special form of radioactive materials** are non-dispersible solid radioactive materials or radioactive materials in a sealed capsule unable to disperse into the surrounding environment.

2.6. **Low specific activity (LSA) material** is the radioactive material with limited specific activity. LSA materials are characterised into three groups:

2.6.1. Group I (LSA-I) includes:

a) Uranium and thorium ores or their concentrates, and other ores containing naturally occurring radionuclides which are intended to be processed for the use of these radionuclides.

b) Solid unirradiated natural uranium or depleted uranium; natural thorium or their compounds or their liquid/solid mixtures.

c) Radioactive materials (other than fissile materials) of which the A2 value is unlimited;

d) Other radioactive materials that are uniformly distributed and the specific activity average does not exceed 30 times of the specific activity as prescribed in Table 1, Table 2 of TCVN 6867-1:2001 (except fissile materials).

2.6.2. Group 2 (LSA-II) includes:

a) Water with tritium concentration up to 0.8 TBq/l (1TBq = 10^{12}Bq).

b) Other radioactive materials that are uniformly distributed and the specific activity average does not exceed 10^{-4} /A_2/g for solids and gases, and 10^{-5} A_2/g for liquids.

2.6.3. Group 3 (LSA-III) includes:

a) A radioactive material that is distributed throughout a solid material or are solidified using binding agents (such as concrete, bitumen, ceramics, etc.).

b) A radioactive material that is insoluble, or contained in a relatively insoluble material that can prevent the radioactive substance from leaching due to the loss of the packaging, and the loss of the radioactive substance by leaching when placed in water for seven days would not exceed 0.1 A_2.

c) A solid radioactive material (excluding the shielding material) that the specific activity average does not exceed 2.10^{-3} A_2/g.

2.7. **A low dispersible radioactive material** is either a solid radioactive material that is not in powder form or a solid radioactive material in a sealed capsule to prevent dispersion.

2.8. **Radioactive contamination** means the presence of radioactive materials on the surface of an object where they are undesirable or could be harmful.

2.9. **Removable radioactive contamination** means the radioactive material that can be removed from a surface during transportation.

2.10. **Fixed radioactive contamination** means the radioactive material that cannot removed from a surface during transportation.

2.11. **Surface radioactive contamination** means the presence of radioactive contamination on the surface of a package or a container or a transport means in quantities in excess of 0.4 Bq/cm^2 for the beta and gamma emitter and low toxicity alpha emitter, or 0.04 Bq/cm^2 for all other alpha emitters.

2.12. **A surface contaminated object (SCO)** is a solid object that is not itself a radioactive material but contaminated with radioactive material. Surface contaminated objects are characterised into two groups:

2.12.1. Group 1 (SCO-I) includes:

a) The removable contamination on an accessible surface of larger than 300 cm^2 (or the total area of the surface if less than 300 cm^2) that does not exceed 4 Bq/cm^2 for beta and gamma emitters and low hazardous alpha emitters, or 0.4 Bq/cm^2 for the other alpha emitters.

b) The fixed contamination on the accessible surface of larger than 300 cm^2 (or the total area of the surface of less than 300 cm^2) that does not exceed 4.10^4 Bq/cm^2 for beta and gamma emitters and low hazardous alpha emitters, or $0.4.10^3$ Bq/cm^2 for the other alpha emitters.

c) The removable contamination and the fixed contamination on the inaccessible surface of larger than 300 cm^2 (or the total area of the surface of less than 300 cm^2) that does not exceed 4.10^4 Bq/cm^2 for beta and gamma emitters and low hazardous alpha emitters, or $0.4.10^3$ Bq/cm^2 for the other alpha emitters.

2.12.2. Group 2 (SCO-II): The fixed or removable contamination on the surface exceeds the limits specified for SCO-I and:

a) The removable contamination on the accessible surface of larger than 300 cm^2 (or the total area of the surface of less than 300 cm^2) that does not exceed 400 Bq/cm^2 for beta and gamma emitters and low hazardous alpha emitters, or 40 Bq/cm^2 for the other alpha emitters.

b) The fixed contamination on the accessible surface of larger than 300 cm^2 (or the area of the surface of less than 300 cm^2) that does not exceed 8.10^5 Bq/cm^2 for beta and gamma emitters and low hazardous alpha emitters, or 8.10^4 Bq/cm^2 for the other alpha emitters.

c) The removable contamination and the fixed contamination on the inaccessible surface of larger than 300 cm^2 (or the total area of the surface of less than 300 cm^2) that does not exceed 8.10^5 Bq/cm^2 for beta and gamma emitters and low hazardous alpha emitters, or 8.10^4 Bq/cm^2 for the other alpha emitters.

2.13. **Unirradiated thorium** is the thorium that contains 10^{-7} gram or less than 10^{-7} gram of uranium-233 in one gram of thorium-232.

2.14. **Unirradiated uranium** is the uranium that contains 2.10^3 Bq or less than 2.10^3 Bq of Plutoni, 9.10^6 Bq or less than 9.10^6 Bq of fissile products and 5.10^{-3} gram or less than 5.10^{-3} gram of uranium-236 in one gram of uranium-235.

2.15. **Natural uranium** is the uranium that is chemically separated containing 99.28% of uranium-238 and 0.72% of uranium-235.

2.16. **Depleted uranium** is the uranium that contains less than 0.72% of uranium-235.

2.17. **Enriched uranium** is the uranium that contains greater than 0.72% of uranium-235.

2.18. **Fissile materials** are uranium-233, uranium-235, plutonium-239, plutonium-241 or any combination of them. Fissile materials do not include natural uranium, depleted uranium that is unirradiated or has been irradiated only in the thermal reactor .

2.19. **Containment** means the assembly of components essential for covering all the radioactive material, preventing adverse effects caused by the radioactive material and suitable for the transported radioactive material characteristics. The containment can comprise of several layers, adsorber, divided, shielding structure, and equipment for loading, unloading, ventilation, pressure reduction, cooling, heat persistance, and transportation. The containment can be boxes or containers, tanks, etc.

2.20. **Radioactive package** (referred to as package) is a structure comprising containments and radioactive material inside, and prepared to be transported.

2.21. **Radioactive consignment** (referred to as consignment) is a radioactive package or several radioactive packages.

2.22. **Container** is a type of containment designed for use for transportation of packaged or unpackaged of goods by different modes of transport without unload and reload. The containers shall be air-tight, strong and re-usable, and can be fitted with handling devices. A small container is that which has external dimensions less than 1.5 m or an internal volume of equal to or less than 3 m^3. A large container has dimensions larger than that of a small container.

2.23. **Tank** is a type of a container, with a capacity of equal to or larger than 450 litres to hold liquids, powders, granules, slurries or solids, and a capacity of equal to or larger than 1000 littre to contain gases.

2.24. **Radiation dose** is the dose rate expressed as millisievert per hour (mSv/h).

2.25. **Exclusive use** means the right of the consignor to use a conveyance or a large freight container, and to have sole responsibility for loading and unloading of goods in accordance with instructions from the consignor or consignee.

2.26. **Design** is the description of a special radioactive material or low dispersion radioactive material or package or packing. The description includes specifications, drawings and an analysis demonstrating compliance with the regulations in this Circulation, Vietnam's Standards and other relevant regulations.

2.27. **Transport Index (TI)** means the number to be used to control over radiation exposure. The calculation for transport index is specified in Section 9 of this Decree.

2.28. **United Nation number (UN number)** is a number of four digits set out by the UN Council of Expert on Transport of dangerous goods in order to identify a specific substance or a group of specific substances.

2.29. **Competent Authority** is the Vietnam Agency for Radiation and Nuclear Safety and Control under the Ministry of Science and Technology, and Provincial/City Departments of Science and Technology.

3. Radiation safety plans

Organisations, individuals involved in the transportation of radioactive material shall establish plans for ensuring radiation safety. The plans shall meet the following requirements:

3.1. Measures for radiation safety during transportation shall be optimised so as to keep individual radiation dose (hereinafter referred to as dose) lower than the dose limit and the number of persons exposed to radiation as minimum as possibly practical.

3.2. Measures for individual radiation protection and measures for radioactive contamination monitoring of packages, packaging areas, storage areas and transportation means shall be established; radiation safety records shall be documented.

3.3. Escort staff shall be trained in radiation safety, have good knowledge in firefighting and regulations on radioactive material safety transportation, and annual provided with refresh training.

3.4. Radioactive packages shall be isolated from its escorts and the public. Isolation distance shall be calculated based on the following dose litmits:

a) Dose limit for escort, loading, unloading and packaging is 5 mSv/year

b) Dose limit for the public in the vinicity of the radioactive area: 1 mSv/year.

3.5. Radioactive packages shall be isolated from undeveloped films. The basis for calculation of isolation distance is the dose limit, that is 0.1 mSv/ package of film.

4. Plans for emergency response

Organisations, individuals involved in the transportation of radioactive material shall establish emergency plans to respond to accidents, incidents during the transportation. The plan shall include the followings:

a) Responsibilities and tasks of every and each involved parties and individuals in the event of accidents, incidents;

b) Procedure for emergency notification of the accidents, incidents to relevant authorities;

c) Procedure for responding to accidents, incidents, and necessary equipment;

d) Means of warning to the public in the surrounding area of the accidents, incidents;

e) Measures for radiation protection, overcoming radiation contamination;

g) Plan for regular training and rehearsal on emergency response.

5. Quality Assurance

Organisations, individuals involved in the transportation of radioactive material shall establish quality assurance programmes for the followings:

a) For the consignor: design, manufacture, testing, documentation, use, maintenance and inspection of all special radioactive material and low dispersible radioactive material, packaging and packages.

b) For the carrier: transportation process and intermediate storage.

The quality assurance programmes shall be based on Vietnam standards and international standards that are accepted in Vietnam.

II. PROVISIONS ON RADIOACTIVE PACKAGES

6. Radioactive packages and their activities

6.1. Radioactive packages are classified into 4 categories, depending on the total activity of the radioactive package and the specific activity of the radioactive material (in the increasing order):

6.1.1. Exempted packages: are packages that contain radioactive material, products containing radioactive material and empty used packaging with the activity equal to or lower than the values specified in Table 1, Annex I.

6.1.2. Industrial packages: are packages that contain radioactive material of low specific activity and surface contaminated objects (see in Table 2 Annex I). The radioactive material in a package shall be limited to such an amount that the activity for a carrier is not higher than the values specified in Table 3 Annex I. Industrial packages are classified into 3 types:

a/ Industrial packages Type 1 (IP-1) may contain:

- Radioactive material of Low Specific Activity Group 1 (LSA-I) in solid form.

- Radioactive material of Low Specific Activity Group 1 (LSA-I) in liquid form using exclusive transportation.

- Surface contaminated objects Group 1 (SCO-I).

b/ Industrial packages Type 2 (IP-II) may contain

- Radioactive material of Low Specific Activity Group 1 (LSA-I) in liquid form, using inexclusive transportation.

- Radioactive material of Low Specific Activity Group 2 (LSA-I) in liquid or gas form, using exclusive transportation.

- Surface contaminated objects Group 2 (SCO-II).

c/ Industrial packages Type 3 (IP-3) may contain:

- Radioactive material of Low Specific Activity Group 2 (LSA-II) in gas or liquid form, using inexclusive transportation.

- Radioactive material of Low Specific Activity Group 3 (LSA-III), using inexclusive transportation.

6.1.3. Packages Type A may contain:

a) Special radioactive material of activity equal to or lower than A1.

b) Other radioactive materials of activity equal to or lower than A2.

c) Mixture of radionuclides: if their names and activities are known, the activity shall satisfy the following condition:

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

where:

B(i) is the activity of radionuclide i in the special radioactive material.

$A_1(i)$ is the A_1 value for radionuclide i.

C(j) is the activity of radionuclide j in radioactive material.

$A_2(j)$ is the A_2 value for radionuclide j.

6.1.4. Package Type B(U) and B(M):

a) Packages Type B may contain any amount of radioactive material, but the package's activity shall not be greater than that approved by the competent authority of the package design. If transported by air, the package Type B shall not have its activity greater than the following:

- For special form radioactive material – 3000 A_1 or 100 000 A_2.
- For all other radioactive material – 3000 A_2.

b) Package Type B may be unilaterally approved by the relevant competent authority of the country of the original design and specified as package Type B(U) or may be multilaterally approved by the relevant competent authority of the country of the original design and countries of transit and final destination, and specified as package Type B(M).

6.2. Packaging, packages of the above Types shall be designed, manufactured, tested in compliance with Vietnam Standards or international standards applicable in Vietnam.

7. Radioactive contamination control

7.1. The removable contamination on the surface of any package shall not exceed the following limits:

a) 4 Bq/cm^2 for beta and gamma emitters and low hazardous alpha emitters.

b) 0.4 Bq/cm^2 for all other alpha emitters.

These limits shall be calculated over any area of 300 cm^2 of any part of the surface or the overall surface if the surface area is less than 300 cm^2.

7.2. The removable contamination on inside and outside of the surface of a freight container shall not exceed the limits specified in Article 7.1.

7.3. If a package is damaged or leaks, or suspected to be damaged or leak, access to the package shall be restricted and assessment of the extent of contamination and the resultant radiation level of the package shall be carried out immediately. The assessment shall be conducted for the package, the carrier, the areas adjacent to the package, and if necessary, all other goods that has been in the carrier.

7.4. Damaged or leaking packages that produce the radioactivity greater than the allowable limits shall be removed to an interim location for repair, decontamination until the origin status is restored.

7.5. Transporters shall periodically check their carriers and equipment used for transportation of radioactive material to determine the level of contamination. The frequency of such checks shall be defined by the extent of the transportation, but shall be at least once a year.

7.6. Any carriers or equipment that has become contaminated with a radioactive level greater than the limits specified in Article 7.1, or with a radioactive level on the surface greater than 5 μSv/h, shall be decontaminated and shall not be used unless the activity is equal to or lower than the limits specified in Article 7.1 or the radiation level is less than 5 μSv/h.

8. Maximum radiation levels

8.1. At any point that is 10 cm above an equipment or an unpackaged product with the activity lower than that of an exempted package the radiation level shall not exceed 0.1 mSv/h.

8.2. The amount of radioactive material LSA or SCO in an industrial package must be limited so as to ensure the dose rate at any point that is 3 m far from the unshielded LSA or SCO shall not exceed 10 mSv/h.

8.3. For exempted packages, the dose rate at the surface shall not exceed 5 μSv/h.

8.4. For other types of packages, the dose rate at any point on the surface of the package shall not exceed 2 mSv/h and the dose rate at any point that is 1 m from the surface shall not exceed 0.1 mSv/h.

8.5. For goods exclusively transported by road and rail, the dose rate at the surface of a package can be greater than 2 mSv/h but shall not exceed 10 mSv/h, if meeting the following requirements:

a) The carrier shall be protected or shielded so as to prevent unauthorised access, except authorised personnel.

b) Packages shall be fixed inside the carrier during the transportation.

c) Load and unload of packages are prohibited during the transportation.

8.6. In case that the packages are transported by air or ship, the dose rate at the surface of a package shall not exceed 2 mSv/h. If it is greater than 2 mSv/h, authorisation by the competent authority shall be obtained.

8.7. The dose rate at the surface of carriers carrying packages, containers shall not exceed 2 mSv/h at any point on the top and at the bottom of the carrier, and the dose rate that is 2 m from the carrier shall not exceed 0.1 mSv/h.

8.8. The dose rate at positions where people may occupy in the carrier shall not exceed 0.02 mSv/h if those people are not protected by shielding.

9. Determination of transport index and Allowable transport index

9.1. The transport index (TI) for a package, container, or for unpackaged LSA-I or SCO-1, shall be determined as follows:

a) The maximum radiation level (in a unit of millisieverts per hour (mSv/h)) at a distance of 1 m from the surface of the package is multiplied by 100 and the resulting figure is the transport index.

b) For tanks, freight containers and unpackaged LSA-I and SCO-I, the value determined in 9.1.a is multiplied by the corresponding factor in Table 4, Annex I.

c) The value obtained in steps 9.1.a and 9.1.b shall be rounded up to the first decimal (e.g. 1.13 becomes 1.2), and a value of 0.05 or less can be considered as zero.

9.2. The transport index of each container or carrier shall be determined as either the sum of the TIs of all the packages contained, or by direct measurement of radiation level as prescribed in 9.1.

9.3. Transport Index is specified as follows:

a) Except for exclusive transportation, the transport index of any package shall not exceed 10.

b) Transport index of containers or carriers that is not exclusively transported is listed in Table 7, Annex I.

c) The sum of TIs of consignment LSA-I is not specifically defined.

d) The sum of TIs of consignment exclusively transported is not specifically defined.

10. Marking

10.1. The following information must be legibly and durably written on the outside of the package:

a) Name of the consignor or consignee, or both;

b) United Nation Number as given in Table 6 Annex I;

c) Gross mass of the package if it exceeds 50 kg;

d) Symbol of the package type, in conformity with the design:

- For industrial package: IP-1, IP-2, IP-3;

- For package type A: Type A;

- For package type B: Type B(U) of Type B(M)

e) In case of Type B(U) or a Type B(M), the following information sahll be added: identification mark allocated to the package design by the competent authority of the country of manufacturing, the serial number of the package in conformity with the package design, and radiation warning as given in Fig. 1, Annex II. This warning sign shall be embossed or stamped resistant to fire and water.

10.2. In case that LSA-I or SCO-I material is contained in receptacles or wrapping materials and transported as specified in Paragraph 15, the surface of these receptacles or wrapping materials shall bear the marking 'RADIO-ACTIVE LSA-I' or 'RADIOACTIVE SCO-I' as appropriate.

10.3. In case that the package is imported or exported, information marked on the package may be in English.

11. Labelling

11.1. Packages are categorised for labeling in conformity with provisions given in Table 5, Annex I and following the following principle: if the TI satisfies requirements for a category but the surface radiation level is in accordance with the requirements for a higher category, the package shall be categorised as the higher category.

Labels for categories are specified in Fig. 2, Fig. 3 and Fig. 4 Annex II. In case of imported/exported package, the language used on the label may be in English.

11.2. Any labels which do not relate to the contents in the package shall be removed or under-covered.

11.3. Labelling is not required for exempted packages. For other packages rather than the exempted packages, labels shall be affixed to two opposite sides of the package outside and on all four sides of freight containers or tanks. The large freight containers may be affixed with the large size labels as determined in Fig. 5 Annex II.

11.4. Each label shall consist of the following information:

a) Except for LSA-I material, name(s) of the radionuclide(s) (using the symbols prescribed in Table I TCVN 6867-1: 2001). For mixtures of radionuclides, the most restrictive nuclides must be listed. For LSA-I material, only the label "LSA-I" is required.

b) Activity: The maximum activity of the radionuclides in Bq with the appropriate SI prefix symbol (kBq, MBq …);

c) Transport index is required only for category II-Yellow, III-Yellow.

12. Warning signs on containers and carriers

12.1. Freight containers carrying packages other than exempted packages and tanks shall bear four yellow signs as specified in Fig. 5 Annex II. In case that the package is imported or exported, the term “radioactive” may be in English. The signs shall be vertically affixed to each side of the freight container or tank. Labels shown in Fig. 2, Fig. 3, Fig. 4 Annex II with the dimensions of the minimum size indicated in Fig. 5 Annex II can be used where appropriate,.

12.2. Carriers of radioactive material shall be affixed with three yellow signs specified in Fig. 5 Annex II on the two rear walls and the back wall.

12.3. The freight container or tank LSA-I or SCO-I that is not packaged or the packaging that contains radioactive material shall be affixed with the appropriate United Nations number (as specified in Table 6 Annex I) in black and 65 mm high or more on the lower half of the sign (as specified in Fig. 5 Annex II).

III. PROVISIONS FOR TRANSPORTATION

13. Isolation during transport and transit storage

13.1. During transport and transit storage packages and freight containers containing radioactive material shall be isolated from:

a) areas occupied by people and undeveloped photographic films with the distance as specified in Paras 3.4 and 3.5.

b) other dangerous goods (explosive, flammable, …).

13.2. Category II-Yellow, III-Yellow packages shall not be carried in passenger compartments, except those solely reversed for authorised escorts.

13.3. In storage, packages shall be placed at least 6m far from each others.

13.4. The transporter shall have the responsibility to maintain the required distance during transport and transit stores.

14. Arragement of packages in carriers and transit stores

14.1. Packages shall be safely and firmly arranged so as to prevent moving, toppling or falling.

14.2. Packages shall be arranged in such manner that their average surface heat fluxes do not exceed $15W/m^2$.

14.3. Loading packages onto a carrier shall be in such manner that the surface radioactive level and transport index do not exceed the limits specified in Paras 8.7 and 9.3.

15. Transportation of unpackaged radioactive material

15.1. Radioactive material LSA-I and surface contaminated objects SCO-I may be transported unpackaged if the following conditions are met:

a) Exclusive transportation is used;

b) LSA-I or SCO-1 are not ores containing radionuclides;

c) No radioactive material shall be released during transportation;

d) Radiation protection is guaranteed.

15.2. If the contamination on accessible and inaccessible surfaces is not greater than ten times the level specified in Para 2.11, exclusive transportation is not required.

15.3. For SCO-I, if the removable contamination on inaccessible surfaces exceeds the values specified in Para. 2.12.1.a, necessary measures shall be taken to ensure that the radioactive material is not released into the carrier.

16. Transportation of empty packagings

Empty packagings that have been used for radioactive material may be transported as exempted packages if the following requirements are met:

a) They are in well maintained conditions and air-tight;

b) Empty packagings that have been used for uranium or thorium shall be protected with metal or other concrete materials;

c) The level of removable contamination on the package internal does not exceed one hundred times the level specified in Para 7.1;

d) Any inappropriate labels shall be covered or removed in conformity with regulations.

17. Transportation of other goods

17.1. No items other than those that are necessary for the use of the radioactive material shall be in the packages.

17.2. Freight containers that have been used for the transportation of radioactive material shall not be used for the storage or transport of other goods unless they are decontaminated to the level below 0.4 Bq/cm^2 for beta and gamma emitters and low hazardous alpha emitters and 0.04 Bq/ cm^2 for other alpha emitters.

18. Additional requirements for transportation by road

18.1. Transportation of radioactive material by road shall be by trucks only. The truck used for radioactive material transportation shall have high level of safety and be biannually examined and checked before every use.

18.2. Carrying passengers are prohibited in vehicle with radioactive material.

18.3. Non-water-resistant packages shall be transported using covered vehicle.

18.4. Vehicle with trailers shall not be used for transportation of radioactive material.

18.5. Vehicle shall be labelled with signs as prescribed in Section 12 and the consignor shall have the responsibility to put up the sign appropriately.

18.6. Parking vehicle shall be guarded, except that the radiation level at any position of the vehicle is lower than 0.005mSv/h and the compartment must be locked so as to prevent unauthorised access. In case that there is no guard, the driver shall leave a card on which his name, address and telephone number are clearly written for contact purpose. The vehicle must be parked 50 m far from population area, except for unloading.

18.7. Drivers must have been trained in radiation safety and emergency response during transportation and be equipped with a suitable dosimeter. If these requirements are not satisfied, each consignment shall be escorted by a person whose quality satisfies all the above requirements.

19. Additional requirements for transportation by rail

19.1. Radioactive material is allowed to be transported by freight train. Non-water-resistant radioactive packages shall be transported using covered carriages.

19.2. The carriage carrying radioactive material must be labelled with signs as specified in Section 12 at both sides. In case of the carriage with no walls, labelling the containers is sufficient. The consignor shall be responsible for labelling the carriage.

19.3. During transportation (except for the transportation of exempted packages), escort shall be required. The escort shall have been trained in radiation safety, and emergency response during transportation and be equipped with suitable dosimeter.

20. Additional requirements for the transport by post

20.1. For exempted packages, activity of the consignment sent by post shall not exceed 1/10 of the values specified in Table 1 Annex I.

20.2. Packages shall bear white labels with the "Radioactive material" clearly written

20.3. Name and address of the sender shall be attached to the consignment under one condition that: it will be sent back to the sender if undelivered.

20.4. The sender's name and address and the package's content shall be clearly written on the packaging.

IV. RESPONSIBILITY TO ENSURING RADIATION SAFETY

21. Consignor's responsibility

21.1. The consignor shall have the responsibility to ensure radiation safety during transportation of radiation material, including packaging checking, packaging, surface decontamination (if necessary), sealing, labelling until the package are handed over to the transporter. The consignor shall prepare packaging in compliance with this Circular, standards for safe transport of radioactive material issued by the Ministry of Science and Technology and other relevant provisions for goods transportation.

21.2. The consignor shall include in the transport documents with each consignment the following information:

a) Shipping name as specified in Table 6 Annex I;

b) The United Nation number: "7";

c) The United Nation number assigned to the material as specified in Table 6 Annex I, preceded by the letters "UN";

d) Name or symbol of each radionuclide, or for mixtures of radionuclides, an appropriate general description or a list of the most restrictive nuclides;

e) A description of the physical and chemical form of the material, or a notation "Special radioactive material" or "Low dispersible radioactive material", respectively.

f) The maximum activity of the radionuclides expressed in units of Bq with an appropriate SI prefix symbol (kBq, MBq).

g) The category of the package, i.e. I-WHITE, II-YELLOW, III-YELLOW;

h) The transport index (for categories II-YELLOW and III-YELLOW only);

i) Identification number in the certificate issued by the competent authority that approved for the transportation of special radioactive material, low dispersible radioactive material, exclusive transportation, package design;

j) For consignments of more than one package, a detailed statement of the contents of each package within the freight container shall be included. If packages are to be unloaded from the freight container at an intermediate point, appropriate transport documents shall be made available;

k) The statement “Exclusive transport”, where a consignment is required to be exclusively transported;

l) The total activity of the consignment as a multiple of A2, for LSA-II, LSA-III, SCO-I and SCO-II.

21.3. The consignor shall include in the transport documents a declaration in the following terms:

“I hereby declare that the contents of this consignment are fully and accurately described and are classified, packed, marked and labelled, and are in all respects in proper condition for transport by … (insert mode(s) of transport) in compliance with the applicable national and international (if the consignment is transported in transit of or into another country(ies)) governmental regulations”. Date of trasportation and signature.

21.4. The consignor shall inform the transporter the following minimum requirements that should be met:

a) Requirements for loading, arrangement, storage, handling and unloading of the packages, including any special requirements on storage for heat safety dissipation;

b) Restrictions on the mode of transportation and necessary instructions for transportation;

c) Emergency response measures appropriate to the consignment.

22. Transporter’s responsibility

22.1. In addition to the applicable provisions on goods transportation, the transporter may accept the consignment if the following requirements are met:

a) The transporter has obtained all required relevant declaration, approval certificates, transport permits in accordance to law and guides on transportation.

b) The transporter has checked that the packages, consignments and freight containers are in accordance with the declaration and satisfy provisions of this Circular. In case that there is inconsistency, the transporter shall have right to refuse transportation, make report and send copies to concerned parties (consignor, consignee) and the competent authority.

22.2. The transporter shall have responsibility to ensure safe transport of radioactive material during transportation and interim storage.

23. Checking, Inspection and Control of Customs

23.1. Customs may unpack packages containing radioactive material for checking only if the packages are suspected to contain illegal goods.

23.2. The unpacking of a radioactive material package requires the presence of representative(s) from the competent authority in radiation safety and control, and shall take place at a place where radiation safety is guaranted and radiation monitoring devices are available.

23.3. Any packages that has been unpacked must be repacked to its original status before being handed over to the consignee.

24. Undeliverable consignments

If a consignment is undeliverable, the consignment shall be placed in a safe location and the appropriate competent authority shall be informed as soon as possible to give instructions on further action.

25. Authorisation for transportation of radioactive material

25.1. The consignor must apply for authorisation for goods to be transported before sending the goods. In case of radioactive goods to be imported, the importer must apply for transportation authorisation before receiving goods. Documents for applying transportation authorisation shall include:

a) Application for authorisation of radioactive material transportation (Annex III, Form 1);

b) Declaration of radioactive material specification (Annex III, Form 2);

c) Documents relative to the package (package type, package certificates, radioactive material certificates);

d) Plan for radiation protection during transportation as specified in Para. 3;

e) Emergency response plan as specified in Para. 4.

Documents to apply for authoriastion for radioactive material transportation shall be sent to the Vietnam Agency for Radiation, Nuclear Safety and Control – The Ministry of Science and Technology.

25.2. Within 75 days of receipt of application documents, the Ministry of Science and Technology shall verify the application documents and issue authorisation or refuse authorisation. If refusing authorisation, the Ministry of Science and Technology shall notify in writing to the applicant.

25.3. Applicants shall pay fees and charges in accordance to law.

26. Response to incidents, accidents during transportation of radioactive material

26.1. In the event of incidents, accidents during transportation, the escort or the controller of the transport shall take the following steps:

a) Immediately inform the local police and the local government authority where the incident or accident occurs, the competent authority who issued transportation authorisation; the consignment owner; the transporter;

b) Take the victim(s) (if any) away from the incident or accident area for first aid treatment and to the nearest clinic;

c) Check if there is any risk of fire and apply emergency measures to overcome (if any);

d) Isolate people 50 m to 200 m away from the incident, accident area and protect the area from unauthorised access.

26.2. Once being informed of an incident or accident, relevant parties as indicated in Para. 26.1. shall send their staff equipped with essential equipment to the scene to minimise consequences as planned prescribed in the Section 4. Depending upon the severity of the incident or accident, the following measures shall be applied:

a) Establishing an emergency response team;

b) Monitoring the radiation level in the surrounding area of the incident, accident so as to apply appropriate measures and restore the initial state.

c) Decontaminating the incident or accident area, the carrier, packages, men, clothes, safety equipment;

d) Examining water sources and food;

e) Protecting drainage systems;

f) Detecting over-exposured persons for monitoring;

g) Investigating cause(s) and documenting the incident, accident.

26.3. Immediately after the accident, the transporter shall make a detail report on the accident and submit it to the competent authority and the police.

26.4. As soon as acknowledging the loss of a radioactive material package the information shall be reported to:

a) The local police;

b) The competent authority;

c) The consignor;

The transporter shall provide the forementioned organisations with adequate information to facilitate the recovery of the lost package.

26.5. The consignor and the transporter shall bear liability and responsibility upon the consequences, level of the violation and seriousness of the incedent, accident, in accordance with law.

V. IMPLEMENTATION

27. Dealing with violation

Organisations and/or individuals involved in transport of radioactive material, violating regulations in this Circular, shall, depending on the seriousness of the violation and its consequence, be disciplined, administratively sanctioned, or examed for penal liability in accordance to the applicable law.

28. Enter into force

This Circular shal take effect 15 days after having been announced on the official gazette. All the previous regulations inconsistent with the provisions in this Circular are nil and void. Any issues arising from the implementation of this Circular shall be promptly reported to the Ministry of Science and Technology./.

Sent to:
- Prime Minister, Deputy Prime Ministers;
- Ministries, ministerial-level agencies, Office of the Government;
- Provincial/City People's Committees;
- Provincial/City Departments of Science and Technology;
- Departments and institutes under MOST;
- Government's official gazette
- Office, VARANSAC

FOR THE MINISTER
OF SCIENCE AND TECHNOLOGY
VICE MINISTER
(Signed)
Hoang Van Huay