



Packaging and Transport  
**Information Incorporated by Reference  
in Canada's *Packaging and Transport of  
Nuclear Substances Regulations, 2015,  
Volume I, Version 2***

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## **Information Incorporated by Reference in Canada's *Packaging and Transport of Nuclear Substances Regulations, 2015, Volume I, Version 2***

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### **Document availability**

This document can be viewed on the CNSC website at [nuclearsafety.gc.ca](http://nuclearsafety.gc.ca). To request a copy of the document in English or French, please contact:

Canadian Nuclear Safety Commission  
280 Slater Street  
P.O. Box 1046, Station B  
Ottawa, Ontario K1P 5S9  
CANADA

Tel.: 613-995-5894 or 1-800-668-5284 (in Canada only)

Facsimile: 613-995-5086

Email: [cnscccsn@canada.ca](mailto:cnscccsn@canada.ca)

Website: [nuclearsafety.gc.ca](http://nuclearsafety.gc.ca)

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## Preface

This regulatory document is part of the CNSC's packaging and transport series of regulatory documents. The full list of regulatory document series is included at the end of this document and can also be found on the [CNSC's website](#).

Regulatory document REGDOC-2.14.1, *Information Incorporated by Reference in Canada's Packaging and Transport of Nuclear Substances Regulations, 2015, Version 2*, links the provisions of the *Packaging and Transport of Nuclear Substances Regulations, 2015* (PTNSR 2015) to:

- specific paragraphs of the International Atomic Energy Agency's *Regulations for the Safe Transport of Nuclear Material*
- the *Nuclear Safety and Control Act*
- other CNSC regulations
- other related codes and information

This document is the second version and supersedes REGDOC-2.14.1, *Information Incorporated by Reference in Canada's Packaging and Transport of Nuclear Substances Regulations, 2015*, published in February 2016.

Canada's PTNSR 2015 provide requirements for licences to transport nuclear substances, for transporting nuclear substances and for record keeping. These regulations also include requirements for the design and certification of packages, special form radioactive material and other prescribed equipment. Requirements under the PTNSR 2015 apply to all persons – including nuclear facilities and CNSC licensees and applicants – who are transporting nuclear substances or offering them for transport.

The PTNSR 2015 primarily address public health, safety and security, and protection of the environment related to the special characteristics of radioactive material. The CNSC and Transport Canada are jointly responsible for ensuring the safe transport of nuclear substances in Canada. Transport Canada's *Transportation of Dangerous Goods Regulations* deal with the transport of all classes of dangerous goods.

For information on the implementation of regulatory documents and on the graded approach, see REGDOC-3.5.3, *Regulatory Fundamentals*.

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## **Information Incorporated by Reference in Canada's *Packaging and Transport of Nuclear Substances Regulations, 2015***

### **1. Introduction**

#### **1.1 Purpose**

Canada's [\*Packaging and Transport of Nuclear Substances Regulations, 2015\*](#) (PTNSR 2015) are based on the regulations established by the International Atomic Energy Agency (IAEA): SSR-6, *Regulations for the Safe Transport of Radioactive Material*, 2018 edition (IAEA Regulations) [1]. All IAEA Member States follow the IAEA Regulations, which assure consistent, safe practices internationally.

The PTNSR 2015 introduce an ambulatory reference to the IAEA Regulations and no longer explicitly identify and list relevant paragraphs from the IAEA Regulations. This change ensures that Canadian regulations will continue to align with international regulations, if international regulations are modified.

#### **1.2 Scope**

To facilitate the use of the PTNSR 2015 and support compliance with regulatory requirements, REGDOC-2.14.1 links provisions in the PTNSR 2015 to relevant content in the IAEA Regulations, the *Nuclear Safety and Control Act*, other CNSC regulations, and other related information.

#### **1.3 Relevant Canadian legislation**

The [\*Nuclear Safety and Control Act\*](#) and the following regulations made under it are relevant to this document:

- [\*General Nuclear Safety and Control Regulations\*](#)
- [\*Radiation Protection Regulations\*](#)
- [\*Nuclear Substances and Radiation Devices Regulations\*](#)
- [\*Nuclear Security Regulations\*](#)

The following legislation from other government departments is also relevant to this document:

- [\*Transportation of Dangerous Goods Act, 1992\*](#)
- [\*Transportation of Dangerous Goods Regulations\*](#)
- [\*Privacy Act\*](#)

#### **1.4 Relevant international regulations, codes and standards and guidance**

The following international regulations, codes and standards are referenced in the PTNSR 2015:

- *Regulations for the Safe Transport of Radioactive Material*, 2018 Edition, IAEA [1]
- *International Maritime Dangerous Goods Code*, International Maritime Organization [2]
- *Technical Instructions for the Safe Transport of Dangerous Goods by Air*, Doc 9284, International Civil Aviation Organization [3]
- *Nuclear Energy – Packaging of Uranium Hexafluoride (UF<sub>6</sub>) for Transport*, ISO 7195, International Organization for Standardization [4]

The following international guidance is also relevant to this document:

- IAEA TS-G-1.4, *The Management System for the Safe Transport of Radioactive Material* [5]
- IAEA SSG-26, *Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material* [6]

## 2. Information Incorporated by Reference in the *Packaging and Transport of Nuclear Substances Regulations, 2015*

This table has been provided for information purposes only. All references are to the IAEA Regulations unless otherwise noted. The referenced legislation and regulations are not official versions. It is the regulated person's responsibility to identify and comply with all applicable regulations and licence conditions.

<b><i>Packaging and Transport of Nuclear Substances Regulations, 2015</i></b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
<b>INTERPRETATION</b>	
1. (1) The following definitions apply in these Regulations.	
"A <sub>1</sub> " has the same meaning as in the <b>IAEA Regulations</b> . « A <sub>1</sub> » "A <sub>2</sub> " has the same meaning as in the <b>IAEA Regulations</b> . « A <sub>2</sub> »	Paragraph 201. A <sub>1</sub> shall mean the activity value of <i>special form radioactive material</i> that is listed in Table 2 or derived in Section IV and is used to determine the activity limits for the requirements of these Regulations. A <sub>2</sub> shall mean the activity value of <i>radioactive material</i> , other than <i>special form radioactive material</i> , that is listed in Table 2 or derived in Section IV and is used to determine the activity limits for the requirements of these Regulations.
"Act" means the <i>Nuclear Safety and Control Act</i> . « Loi »	
"activity" means the number of nuclear transformations occurring per unit of time, as measured in becquerels. « activité »	
"alternative activity limit for an exempt consignment", in respect of an instrument or article, means an activity limit for a consignment that is above the activity limit for an exempt consignment set out in the <b>IAEA Regulations</b> and that has been approved as meeting the exemption criteria set out in those Regulations for an instrument or article. « <i>autre limite d'activité pour un envoi exempté</i> »	<b>DETERMINATION OF BASIC RADIONUCLIDE VALUES</b> Paragraph 403 For individual radionuclides: (b) In instruments or articles in which the <i>radioactive material</i> is enclosed in or is included as a component part of the instrument or other manufactured article and which meets para. 423(c), alternative basic radionuclide values to those in Table 2 for the activity limit for an exempt <i>consignment</i> are permitted and shall require <i>multilateral approval</i> . Such alternative activity limits for an exempt <i>consignment</i> shall be calculated in accordance with the principles set out in the GSR Part 3 [7].
"basic radionuclide value" means either an A <sub>1</sub> in TBq, an A <sub>2</sub> in TBq, an activity concentration limit for an exempt material in Bq/g or an activity limit for an exempt consignment in Bq, as set out in the <b>IAEA Regulations</b> . « <i>valeur de base pour un radionucléide</i> »	<b>BASIC RADIONUCLIDE VALUES</b> Paragraph 402. The following basic values for individual radionuclides are given in Table 2: (a) A <sub>1</sub> and A <sub>2</sub> in TBq; (b) Activity concentration limits for exempt material in Bq/g; (c) Activity limits for exempt consignments in Bq.

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
"carrier" has the same meaning as in section 1.4 of the <b>Transportation of Dangerous Goods Regulations</b> . « <i>transporteur</i> »	<a href="#">Transportation of Dangerous Goods Regulations</a> , Section 1.4 Carrier: means a person who, whether or not for hire or reward, has possession of dangerous goods while they are in transport.
"certificate" means a document issued by the Commission under paragraph 21(1)(h) of the <b>Act</b> or by a designated officer authorized under paragraph 37(2)(a) of the <b>Act</b> , indicating the certification of (a) a package design; (b) a design for special form radioactive material; (c) a design for low dispersible radioactive material; (d) the calculation of a value demonstrating that fissile-excepted radioactive material will remain subcritical; (e) the calculation of the basic radionuclide value for radioactive material that has a basic radionuclide value that is not listed in the <b>IAEA Regulations</b> ; or (f) the calculation, for an instrument or article that has an alternative activity limit for an exempt consignment, of the alternative activity limit. « <i>document d'homologation</i> »	<a href="#">Nuclear Safety and Control Act</a> 21. (1) The Commission may, in order to attain its objects, [...] (h) certify and decertify prescribed equipment for the purposes of this Act; 37. (2) The Commission may authorize a designated officer to (a) certify and decertify prescribed equipment for the purposes of this Act;
"confinement system" means the assembly of fissile material and packaging components intended to preserve criticality safety. « <i>système d'isolement</i> »	
"consignee" has the same meaning as in the <b>IAEA Regulations</b> . « <i>destinataire</i> »	Paragraph 210. <i>Consignee</i> shall mean any person, organization or government that is entitled to take delivery of a <i>consignment</i> .
"consignment" has the same meaning as in the <b>IAEA Regulations</b> . « <i>envoi</i> »	Paragraph 211. <i>Consignment</i> shall mean any <i>package</i> or <i>packages</i> , or load of <i>radioactive material</i> , presented by a <i>consignor</i> for transport.
"consignor" has the same meaning as in section 1.4 of the <b>Transportation of Dangerous Goods Regulations</b> . « <i>expéditeur</i> »	<a href="#">Transportation of Dangerous Goods Regulations</a> , Section 1.4: Consignor: means a person in Canada who (a) is named in a shipping document as the consignor; (b) imports or who will import dangerous goods into Canada; or (c) if paragraphs (a) and (b) do not apply, has possession of dangerous goods immediately before they are in transport.
"containment system" has the same meaning as in the <b>IAEA Regulations</b> . « <i>enveloppe de confinement</i> »	Paragraph 213. <i>Containment system</i> shall mean the assembly of components of the <i>packaging</i> specified by the designer as intended to retain the <i>radioactive material</i> during transport.
"contamination" has the same meaning as in the <b>IAEA Regulations</b> . « <i>contamination</i> »	Paragraph 214. <i>Contamination</i> shall mean 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 <i>low toxicity alpha emitters</i> , or 0.04 Bq/cm <sup>2</sup> for all other alpha emitters.
"conveyance" has the same meaning as in the <b>IAEA Regulations</b> . « <i>moyen de transport</i> »	Paragraph 217. <i>Conveyance</i> shall mean: (a) For transport by road or rail: any <i>vehicle</i> ;

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	(b) For transport by water: any vessel, or any hold, compartment, or defined deck area of a vessel; (c) For transport by air: any aircraft.
"criticality safety index" has the same meaning as in the <b>IAEA Regulations</b> . « <i>indice de sûreté-criticité</i> »	Paragraph 218. <i>Criticality safety index</i> (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.
"effective dose" has the same meaning as in subsection 1(1) of the <b>Radiation Protection Regulations</b> . « <i>dose efficace</i> »	<u><a href="#">Radiation Protection Regulations</a></u> "effective dose" means the sum of the products, in sievert, obtained by multiplying the equivalent dose of radiation received by and committed to each organ or tissue set out in column 1 of an item of Schedule 1 by the weighting factor set out in column 2 of that item.
"excepted package" means a package that is designed in accordance with the applicable requirements of the <b>IAEA Regulations</b> . « <i>colis excepté</i> »	Paragraph 622. An <i>excepted package</i> shall be designed to meet the requirements specified in paras 607–618 and, in addition, the requirement of para 636 if it contains <i>fissile material</i> allowed by one of the provisions of subparagraphs (a)–(f) of para. 417, and the requirements of paras 619–621 if carried by air.
"exclusive use" has the same meaning as in the <b>IAEA Regulations</b> . « <i>utilisation exclusive</i> »	Paragraph 221. <i>Exclusive use</i> shall mean 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, where so required by these Regulations.
"fissile-excepted radioactive material" means fissile radioactive material that is (a) excepted from being classified as fissile in accordance with the <b>IAEA Regulations</b> ; or (b) contained in a package that is excepted from being classified as fissile in accordance with those Regulations. « <i>matière radioactive fissile exceptée</i> »	<u><a href="#">Fissile Material</a></u> Paragraph 417. <i>Fissile material</i> and packages containing <i>fissile material</i> shall be classified under the relevant entry as "FISSILE" in accordance with Table 1 unless excepted by one of the provisions of subparagraphs (a)–(f) of this paragraph and transported subject to the requirements of para. 570. All provisions apply only to material in packages that meets the requirements of para. 636, unless unpackaged material is specifically allowed in the provision: (a) <i>Uranium</i> enriched in uranium-235 to a maximum of 1% by mass, and with a total plutonium and uranium-233 content not exceeding 1% of the mass of uranium-235, provided that the <i>fissile nuclides</i> are distributed essentially homogeneously throughout the material. In addition, if uranium-235 is present in metallic, oxide or carbide forms, it shall not form a lattice arrangement. (b) Liquid solutions of uranyl nitrate enriched in uranium-235 to a maximum of 2% by mass, with a total plutonium and uranium-233 content not exceeding 0.002% of the mass of <i>uranium</i> , and with a minimum nitrogen to <i>uranium</i> atomic ratio (N/U) of 2. (c) <i>Uranium</i> with a maximum <i>uranium</i> enrichment of 5% by mass of uranium-235 provided: (i) There is no more than 3.5 g of uranium-235 per package.



<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	<p>(ii) The total plutonium and uranium-233 content does not exceed 1% of the mass of uranium-235 per <i>package</i>.</p> <p>(iii) Transport of the <i>package</i> is subject to the <i>consignment</i> limit provided in para. 570(c).</p> <p>(d) <i>Fissile nuclides</i> with a total mass not greater than 2.0 g per <i>package</i>, provided the <i>package</i> is transported subject to the <i>consignment</i> limit provided in para. 570(d).</p> <p>(e) <i>Fissile nuclides</i> with a total mass not greater than 45 g, either packaged or unpackaged, subject to the requirements of para. 570(e).</p> <p>(f) A <i>fissile material</i> that meets the requirements of paras 570(b), 606 and 802.</p>
<p>“fissile material” has the same meaning as in the <b>IAEA Regulations</b>. « <i>matière fissile</i> »</p>	<p>Paragraph 222. <i>Fissile nuclides</i> shall mean uranium-233, uranium-235, plutonium-239 and plutonium-241. <i>Fissile material</i> shall mean a material containing any of the <i>fissile nuclides</i>. Excluded from the definition of <i>fissile material</i> are the following:</p> <p>(a) <i>Natural uranium</i> or <i>depleted uranium</i> that is unirradiated;</p> <p>(b) <i>Natural uranium</i> or <i>depleted uranium</i> that has been irradiated in thermal reactors only;</p> <p>(c) Material with <i>fissile nuclides</i> less than a total of 0.25 g;</p> <p>(d) Any combination of (a), (b) and/or (c).</p> <p>These exclusions are only valid if there is no other material with <i>fissile nuclides</i> in the <i>package</i> or in the <i>consignment</i> if shipped unpackaged.</p>
<p>“freight container” has the same meaning as in the <b>International Maritime Dangerous Goods Code</b>. « <i>conteneur</i> »</p>	<p><i>International Maritime Dangerous Goods Code</i> [2]</p> <p>Freight container means an article of transport equipment that is of a permanent character and accordingly strong enough to be suitable for repeated use; specially designed to facilitate the transport of goods, by one or more modes of transport, without intermediate reloading; designed to be secured and/or readily handled, having fittings for these purposes, and approved in accordance with the <i>International Convention for Safe Containers (CSC)</i>, 1972, as amended. In addition, “small freight container” means a freight container that has an internal volume of not more than 3 m<sup>3</sup>. Large freight container means a freight container that has an internal volume of more than 3 m<sup>3</sup>.</p> <p>For freight containers for the transport of radioactive material, a freight container may be used as a packaging. A small freight container is that which has either any overall outer dimension less than 1.5 m, or an internal volume of not more than 3 m<sup>3</sup>. Any other freight container is considered to be a large freight container.</p>
<p>“IAEA” means the International Atomic Energy Agency. « <i>AIEA</i> »</p>	
<p>“IAEA Regulations” means the <b>Regulations for the Safe Transport of Radioactive Material</b>, published by the International Atomic Energy Agency, as amended from time to time. « <i>Règlement de l’AIEA</i> »</p>	

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
"instrument or article" means any tool, implement or object, or its components, that encloses nuclear substances and that is fabricated for a particular use other than solely for enclosing those nuclear substances. « <i>Appareils ou objets</i> »	
" <b>International Maritime Dangerous Goods Code</b> " means the document of that name published by the International Maritime Organization, as amended from time to time. « <i>Code maritime internationale des marchandises dangereuses</i> »	
"large object" means an object that has been decommissioned from a nuclear facility, that is internally contaminated with nuclear substances meeting the requirements applicable to an SCO-I or SCO-II as set out in the <b>IAEA Regulations</b> and that cannot be transported in a type of package described in these Regulations due to its dimensions. « <i>objet de grande dimension</i> »	<p>Paragraph 413. SCO shall be in one of three groups:</p> <p>(a) SCO-I: A solid object on which:</p> <ul style="list-style-type: none"> <li>(i) The <i>non-fixed contamination</i> on the accessible 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 4 Bq/cm<sup>2</sup> for beta and gamma emitters and <i>low toxicity alpha emitters</i>, or 0.4 Bq/cm<sup>2</sup> for all other alpha emitters;</li> <li>(ii) The <i>fixed contamination</i> on the accessible 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 4 × 10<sup>4</sup> Bq/cm<sup>2</sup> for beta and gamma emitters and <i>low toxicity alpha emitters</i>, or 4000 Bq/cm<sup>2</sup> for all other alpha emitters;</li> <li>(iii) The <i>non-fixed contamination</i> plus the <i>fixed contamination</i> 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 4 × 10<sup>4</sup> Bq/cm<sup>2</sup> for beta and gamma emitters and <i>low toxicity alpha emitters</i>, or 4000 Bq/cm<sup>2</sup> for all other alpha emitters.</li> </ul> <p>(b) SCO-II: A solid object on which either the fixed or <i>non-fixed contamination</i> on the surface exceeds the applicable limits specified for SCO-I in (a) above and on which:</p> <ul style="list-style-type: none"> <li>(i) The <i>non-fixed contamination</i> on the accessible 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 400 Bq/cm<sup>2</sup> for beta and gamma emitters and <i>low toxicity alpha emitters</i>, or 40 Bq/cm<sup>2</sup> for all other alpha emitters;</li> <li>(ii) The <i>fixed contamination</i> on the accessible 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 × 10<sup>5</sup> Bq/cm<sup>2</sup> for beta and gamma emitters and <i>low toxicity alpha emitters</i>, or 8 × 10<sup>4</sup> Bq/cm<sup>2</sup> for all other alpha emitters;</li> <li>(iii) The <i>non-fixed contamination</i> 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 × 10<sup>5</sup> Bq/cm<sup>2</sup> for beta and gamma emitters and <i>low toxicity alpha emitters</i>, or 8 × 10<sup>4</sup> Bq/cm<sup>2</sup> for all other alpha emitters.</li> </ul> <p>(c) SCO-III: A large solid object which, because of its size, cannot be transported in a type of <i>package</i> described in these Regulations and for which:</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	<p>(i) All openings are sealed to prevent release of <i>radioactive material</i> during conditions defined in para. 520(e);</p> <p>(ii) The inside of the object is as dry as practicable;</p> <p>(iii) The <i>non-fixed contamination</i> on the external surfaces does not exceed the limits specified in para. 508;</p> <p>(iv) The <i>non-fixed contamination</i> plus the <i>fixed contamination</i> on the inaccessible surface averaged over 300 cm<sup>2</sup> does not exceed 8 x 10<sup>5</sup> Bq/cm<sup>2</sup> for beta and gamma emitters and <i>low toxicity alpha emitters</i>, or 8 x 10<sup>4</sup> Bq/cm<sup>2</sup> for all other alpha emitters.</p>
<p>"low dispersible radioactive material" has the same meaning as in the <b>IAEA Regulations</b>. « <i>matière radioactive faiblement dispersable</i> »</p>	<p>Paragraph 225. <i>Low dispersible radioactive material</i> shall mean either a solid <i>radioactive material</i> or a solid <i>radioactive material</i> in a sealed capsule, that has limited dispersibility and is not in powder form.</p>
<p>"low toxicity alpha emitters" has the same meaning as in the <b>IAEA Regulations</b>. « <i>émetteurs alpha de faible toxicité</i> »</p>	<p>Paragraph 227. <i>Low toxicity alpha emitters</i> are: <i>natural uranium</i>, <i>depleted uranium</i>, natural thorium, uranium-235, uranium-238, thorium-232, thorium-228 and thorium-230 when contained in ores, or in physical and chemical concentrates; or alpha emitters with a half-life of less than 10 days.</p>
<p>"LSA material" has the meaning assigned by the definition "low specific activity (LSA) material" in the <b>IAEA Regulations</b>. « <i>matière LSA</i> »</p>	<p>Paragraph 226. <i>Low specific activity (LSA) material</i> shall mean <i>radioactive material</i> that by its nature has a limited <i>specific activity</i>, or <i>radioactive material</i> for which limits of estimated average <i>specific activity</i> apply. External shielding materials surrounding the <i>LSA material</i> shall not be considered in determining the estimated average <i>specific activity</i>.</p>
<p>"management system" has the same meaning as in the <b>IAEA Regulations</b>. « <i>système de gestion</i> »</p>	<p>Paragraph 228. <i>Management system</i> shall mean a set of interrelated or interacting elements for establishing policies and objectives and enabling the objectives to be achieved in an efficient and effective manner.</p>
<p>"overpack" has the same meaning as in the <b>IAEA Regulations</b>. « <i>suremballage</i> »</p>	<p>Paragraph 230. <i>Overpack</i> shall mean an enclosure used by a single <i>consignor</i> to contain one or more <i>packages</i>, and to form one unit for convenience of handling and stowage during transport.</p>
<p>"package" means packaging with its radioactive contents, as presented for transport. « <i>colis</i> »</p>	
<p>"packaging" has the same meaning as in the <b>IAEA Regulations</b>. « <i>emballage</i> »</p>	<p>Paragraph 232. <i>Packaging</i> shall mean one or more receptacles and any other components or materials necessary for the receptacles to perform containment and other safety functions.</p>
<p>"passenger" has the same meaning as in section 1.4 of the <b>Transportation of Dangerous Goods Regulations</b>. « <i>passager</i> »</p>	<p><a href="#">Transportation of Dangerous Goods Regulations</a>, Section 1.4</p> <p>Passenger: Means</p> <p>(a) for a ship, a person defined as a passenger in the "Canada Shipping Act"; and</p> <p>(b) for a road vehicle, a railway vehicle or an aircraft, a person carried on board the means of transport but does not include</p> <p>(i) a crew member,</p> <p>(ii) a person who is accompanying dangerous goods or other cargo,</p> <p>(iii) an operator, owner or charterer of the means of transport,</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	(iv) an employee of the operator, owner or charterer of the means of transport, who is acting in the course of employment, or (v) a person carrying out inspection or investigation duties under an Act of Parliament or of a provincial legislature.  (passager)
"prescribed equipment" means equipment that is prescribed under paragraph 20(a) of the <b>General Nuclear Safety and Control Regulations</b> . « équipement réglementé »	<a href="#">General Nuclear Safety and Control Regulations</a>  PRESCRIBED EQUIPMENT  20. Each of the following items is prescribed equipment for the purposes of the Act:  (a) a package, special form radioactive material, low dispersible radioactive material, fissile-excepted radioactive material, radioactive material that has a basic radionuclide value that is not listed in the IAEA Regulations and an instrument or article that has an alternative activity limit for an exempt consignment, as those terms are defined in subsection 1(1) of the <a href="#">Packaging and Transport of Nuclear Substances Regulations, 2015</a> ;
"radioactive material" means a nuclear substance that is a radioactive material, as defined in the <b>IAEA Regulations</b> . « matière radioactive »	Paragraph 236. <i>Radioactive material</i> shall mean any material containing radionuclides where both the activity concentration and the total activity in the <i>consignment</i> exceed the values specified in paras 402–407.
"registered user" means a person who has received confirmation under subsection 19(3) from the Commission that their use of a package has been registered. « usager inscrit »	
"SCO" has the meaning assigned by the definition "surface contaminated object (SCO)" in the <b>IAEA Regulations</b> . « SCO »	Paragraph 241. <i>Surface contaminated object (SCO)</i> shall mean a solid object that is not itself radioactive but which has <i>radioactive material</i> distributed on its surface.
"special form radioactive material" has the same meaning as in the <b>IAEA Regulations</b> . « matière radioactive sous forme spéciale »	Paragraph 239. <i>Special form radioactive material</i> shall mean either an indispersible solid <i>radioactive material</i> or a sealed capsule containing <i>radioactive material</i> .
"specific activity" has the same meaning as in the <b>IAEA Regulations</b> . « activité spécifique »	Paragraph 240. <i>Specific activity</i> of a radionuclide shall mean the activity per unit mass of that nuclide. The <i>specific activity</i> of a material shall mean the activity per unit mass of the material in which the radionuclides are essentially uniformly distributed.
" <b>Technical Instructions for the Safe Transport of Dangerous Goods by Air</b> " means the document of that name, designated as Doc 9284, published by the International Civil Aviation Organization, as amended from time to time. « <i>Instructions techniques pour la sécurité du transport aérien des marchandises dangereuses</i> »	

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
"transit" means the process of being transported through Canada after being imported into and before being exported from Canada, in a situation where the place of initial loading and the final destination are outside Canada. « <i>transit</i> »	
"transport index" has the same meaning as in the <b>IAEA Regulations</b> . « <i>indice de transport</i> »	Paragraph 244. <i>Transport index</i> (TI) assigned to a <i>package, overpack or freight container</i> , or to unpackaged <i>LSA-I, SCO-I, or SCO-III</i> shall mean a number that is used to provide control over radiation exposure.
"Type A", in respect of a package, means that the package is designed in accordance with the applicable requirements of the <b>IAEA Regulations</b> . « <i>type A</i> »	<p><b>REQUIREMENTS FOR TYPE A PACKAGES</b></p> <p>Paragraph 635. <i>Type A packages</i> shall be designed to meet the requirements specified in paras 607–618 and, in addition, the requirements of paras 619–621 if carried by air, and of paras 636–651.</p>
"Type B", in respect of a package, means that the package is classified as either a Type B(U) or a Type B(M) package in accordance with the <b>IAEA Regulations</b> and is designed in accordance with the applicable requirements of those Regulations. « <i>type B</i> »	<p><u>Classification as Type B(U), Type B(M) or Type C package</u></p> <p>Paragraph 431. <i>Type B(U), Type B(M) and Type C packages</i> shall be classified in accordance with the <i>competent authority certificate of approval</i> for the <i>package design</i> issued by the country of origin of <i>design</i>.</p> <p>Paragraph 432. The contents of a <i>Type B(U), Type B(M) or Type C package</i> shall be as specified in the <i>certificate of approval</i>.</p> <p>Paragraph 433. <i>Type B(U) and Type B(M) packages</i>, if transported by air, shall meet the requirements of para. 432 and shall not contain activities greater than the following:</p> <ul style="list-style-type: none"> <li>(a) For <i>low dispersible radioactive material</i> — as authorized for the <i>package design</i> as specified in the <i>certificate of approval</i>;</li> <li>(b) For <i>special form radioactive material</i> — <math>3000A_1</math> or <math>10^5A_2</math>, whichever is the lower;</li> <li>(c) For all other <i>radioactive material</i> — <math>3000A_2</math>.</li> </ul> <p><b>REQUIREMENTS FOR TYPE B(U) PACKAGES</b></p> <p>Paragraph 652. <i>Type B(U) packages</i> shall be designed to meet the requirements specified in paras 607–618, the requirements specified in paras 619–621 if carried by air, and in paras 636–649, except as specified in para. 648(a), and, in addition, the requirements specified in paras 653–666.</p> <p><b>REQUIREMENTS FOR TYPE B(M) PACKAGES</b></p> <p>Paragraph 667. <i>Type B(M) packages</i> shall meet the requirements for <i>Type B(U) packages</i> specified in para. 652, except that for <i>packages</i> to be transported solely within a specified country or solely between specified countries, conditions other than those given in paras 639, 655–657 and 660–666 may be assumed with the <i>approval</i> of the <i>competent authorities</i> of these countries. The requirements for <i>Type B(U) packages</i> specified in paras 655 and 660–666 shall be met as far as practicable.</p> <p>Paragraph 668. Intermittent venting of <i>Type B(M) packages</i> may be permitted during transport, provided that the operational controls for venting are acceptable to the relevant <i>competent authorities</i>.</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
"Type C", in respect of a package, means that the package is designed in accordance with the applicable requirements of the <b>IAEA Regulations</b> . « <i>type C</i> »	<p><b>REQUIREMENTS FOR TYPE C PACKAGES</b></p> <p>Paragraph 669. <i>Type C packages</i> shall be designed to meet the requirements specified in paras 607–621 and 636–649, except as specified in para. 648(a), and the requirements specified in paras 653–657, 661–666 and 670–672.</p>
"Type H(M)", in respect of a package, means that the package has a type code of H(M) in accordance with the <b>IAEA Regulations</b> and is an excepted package, Type IP-1 package, Type IP-2 package, Type IP-3 package or Type A package that is designed to contain more than 0.1 kg of uranium hexafluoride that is non-fissile material or is fissile-excepted radioactive material. « <i>type H(M)</i> »	<p><b>REQUIREMENTS FOR PACKAGES CONTAINING URANIUM HEXAFLUORIDE</b></p> <p>Paragraph 631. <i>Packages</i> designed to contain uranium hexafluoride shall meet the requirements that pertain to the radioactive and fissile properties of the material prescribed elsewhere in these Regulations. Except as allowed in para. 634, uranium hexafluoride in quantities of 0.1 kg or more shall also be packaged and transported in accordance with the provisions of the International Organization for Standardization document: Nuclear Energy – Packaging of Uranium Hexafluoride (UF<sub>6</sub>) for Transport (ISO 7195) [4], and the requirements of paras 632 and 633.</p> <p>Paragraph 634. Subject to <i>multilateral approval</i>, <i>packages</i> designed to contain 0.1 kg or more of uranium hexafluoride may be transported if the <i>packages</i> are designed:</p> <ul style="list-style-type: none"> <li>(a) To international or national standards other than ISO 7195 [4], provided an equivalent level of safety is maintained; and/or</li> <li>(b) To withstand, without leakage and without unacceptable stress, a test pressure of less than 2.76 MPa as specified in para. 718; and/or</li> <li>(c) To contain 9000 kg or more of uranium hexafluoride and the <i>packages</i> do not meet the requirement of para. 632(c).</li> </ul> <p>In all other respects, the requirements specified in paras 631–633 shall be satisfied.</p>
"Type H(U)", in respect of a package, means that the package has a type code of H(U) in accordance with the <b>IAEA Regulations</b> and is an excepted package, Type IP-1 package, Type IP-2 package, Type IP-3 package or Type A package that is designed to contain more than 0.1 kg of uranium hexafluoride that is non-fissile material or is fissile-excepted radioactive material. « <i>type H(U)</i> »	<p><b>REQUIREMENTS FOR PACKAGES CONTAINING URANIUM HEXAFLUORIDE</b></p> <p>Paragraph 631. <i>Packages</i> designed to contain uranium hexafluoride shall meet the requirements that pertain to the radioactive and fissile properties of the material prescribed elsewhere in these Regulations. Except as allowed in para. 634, uranium hexafluoride in quantities of 0.1 kg or more shall also be packaged and transported in accordance with the provisions of the International Organization for Standardization document: Nuclear Energy — Packaging of Uranium Hexafluoride (UF<sub>6</sub>) for Transport (ISO 7195) [4], and the requirements of paras 632 and 633.</p>
"Type IP-1", in respect of a package, means that the package is designed in accordance with the applicable requirements of the <b>IAEA Regulations</b> . « <i>type IP-1</i> »	<p><b>Requirements for Type IP-1</b></p> <p>Paragraph 623. A <i>Type IP-1 package</i> shall be designed to meet the requirements specified in paras 607–618 and 636 and, in addition, the requirements of paras 619–621 if carried by air.</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
<p>"Type IP-2", in respect of a package, means that the package is designed in accordance with the applicable requirements of the <b>IAEA Regulations</b>. « <i>type IP-2</i> »</p>	<p><u>Requirements for Type IP-2</u></p> <p>Paragraph 624. A <i>package</i> to be qualified as <i>Type IP-2</i> shall be designed to meet the requirements for <i>Type IP-1</i> as specified in para. 623 and, in addition, if it were subjected to the tests specified in paras 722 and 723, it would prevent:</p> <ul style="list-style-type: none"> <li>(a) Loss or dispersal of the <i>radioactive contents</i>;</li> <li>(b) More than a 20% increase in the maximum <i>dose rate</i> at any external surface of the <i>package</i>.</li> </ul> <p>Paragraph 626. <i>Packages</i> may be used as <i>Type IP-2</i>, provided that:</p> <ul style="list-style-type: none"> <li>(a) They satisfy the requirements for <i>Type IP-1</i> specified in para. 623.</li> <li>(b) They are designed to satisfy the requirements prescribed for UN Packing Group I or II in Chapter 6.1 of the United Nations Recommendations on the Transport of Dangerous Goods, Model Regulations [8].</li> <li>(c) When subjected to the tests required for UN Packing Group I or II, they would prevent: <ul style="list-style-type: none"> <li>(i) Loss or dispersal of the <i>radioactive contents</i>;</li> <li>(ii) More than a 20% increase in the maximum <i>dose rate</i> at any external surface of the <i>package</i>.</li> </ul> </li> </ul> <p>Paragraph 627. <i>Portable tanks</i> may also be used as <i>Type IP-2</i> or <i>Type IP-3</i>, provided that:</p> <ul style="list-style-type: none"> <li>(a) They satisfy the requirements for <i>Type IP-1</i> specified in para. 623.</li> <li>(b) They are designed to satisfy the requirements prescribed in Chapter 6.7 of the United Nations Recommendations on the Transport of Dangerous Goods, Model Regulations [8], or other requirements, at least equivalent, and are capable of withstanding a test pressure of 265 kPa.</li> <li>(c) They are designed so that any additional shielding that is provided shall be capable of withstanding the static and dynamic stresses resulting from handling and routine conditions of transport and of preventing more than a 20% increase in the maximum <i>dose rate</i> at any external surface of the <i>portable tanks</i>.</li> </ul> <p>Paragraph 628. <i>Tanks</i>, other than <i>portable tanks</i>, may also be used as <i>Type IP-2</i> or <i>Type IP-3</i> for transporting <i>LSA-I</i> and <i>LSA-II</i> as prescribed in Table 5, provided that:</p> <ul style="list-style-type: none"> <li>(a) They satisfy the requirements for <i>Type IP-1</i> specified in para. 623.</li> <li>(b) They are designed to satisfy the requirements prescribed in regional or national regulations for the transport of dangerous goods and are capable of withstanding a test pressure of 265 kPa.</li> <li>(c) They are designed so that any additional shielding that is provided shall be capable of withstanding the static and dynamic stresses resulting from handling and routine conditions of transport and of preventing more than a 20% increase in the maximum <i>dose rate</i> at any external surface of the <i>tanks</i>.</li> </ul>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	<p>Paragraph 629. <i>Freight containers</i> with the characteristics of a permanent enclosure may also be used as <i>Type IP-2</i> or <i>Type IP-3</i>, provided that:</p> <ul style="list-style-type: none"> <li>(a) The <i>radioactive contents</i> are restricted to solid materials.</li> <li>(b) They satisfy the requirements for <i>Type IP-1</i> specified in para. 623.</li> <li>(c) They are designed to conform to the International Organization for Standardization document: Series 1 Freight containers — Specifications and Testing — Part 1: General Cargo Containers for General Purposes ISO 1496-1 [9] excluding dimensions and ratings. They shall be so designed such that if subjected to the tests prescribed in that document, and to the accelerations occurring during routine conditions of transport, they would prevent: <ul style="list-style-type: none"> <li>(i) Loss or dispersal of the <i>radioactive contents</i>;</li> <li>(ii) More than a 20% increase in the maximum <i>dose rate</i> at any external surface of the <i>freight containers</i>.</li> </ul> </li> </ul> <p>Paragraph 630. Metal <i>IBCs</i> may also be used as <i>Type IP-2</i> or <i>Type IP-3</i>, provided that:</p> <ul style="list-style-type: none"> <li>(a) They satisfy the requirements for <i>Type IP-1</i> specified in para. 623.</li> <li>(b) They are designed to satisfy the requirements prescribed for UN Packing Group I or II in Chapter 6.5 of the United Nations Recommendations on the Transport of Dangerous Goods, Model Regulations [8], and if they were subjected to the tests prescribed in that document, but with the drop test conducted in the most damaging orientation, they would prevent: <ul style="list-style-type: none"> <li>(i) Loss or dispersal of the <i>radioactive contents</i>;</li> <li>(ii) More than a 20% increase in the maximum <i>dose rate</i> at any external surface of the <i>IBC</i>.</li> </ul> </li> </ul>
<p>“Type IP-3”, in respect of a package, means that the package is designed in accordance with the applicable requirements of the <b>IAEA Regulations</b>. « <i>type IP-3</i> »</p>	<p><b>Requirements for Type IP-3</b></p> <p>Paragraph 625. A <i>package</i> to be qualified as <i>Type IP-3</i> shall be designed to meet the requirements for <i>Type IP-1</i> as specified in para. 623 and, in addition, the requirements specified in paras 636–649.</p> <p>Paragraph 627. Portable <i>tanks</i> may also be used as <i>Type IP-2</i> or <i>Type IP-3</i>, provided that:</p> <ul style="list-style-type: none"> <li>(a) They satisfy the requirements for <i>Type IP-1</i> specified in para. 623.</li> <li>(b) They are designed to satisfy the requirements prescribed in Chapter 6.7 of the United Nations Recommendations on the Transport of Dangerous Goods, Model Regulations [8], or other requirements, at least equivalent, and are capable of withstanding a test pressure of 265 kPa.</li> <li>(c) They are designed so that any additional shielding that is provided shall be capable of withstanding the static and dynamic stresses resulting from handling and routine conditions of transport and of preventing more than a 20% increase in the maximum <i>dose rate</i> at any external surface of the portable <i>tanks</i>.</li> </ul>



<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	<p>Paragraph 628. <i>Tanks</i>, other than portable <i>tanks</i>, may also be used as <i>Type IP-2</i> or <i>Type IP-3</i> for transporting <i>LSA-I</i> and <i>LSA-II</i> as prescribed in Table 5, provided that:</p> <ul style="list-style-type: none"> <li>(a) They satisfy the requirements for <i>Type IP-1</i> specified in para. 623.</li> <li>(b) They are designed to satisfy the requirements prescribed in regional or national regulations for the transport of dangerous goods and are capable of withstanding a test pressure of 265 kPa.</li> <li>(c) They are designed so that any additional shielding that is provided shall be capable of withstanding the static and dynamic stresses resulting from handling and routine conditions of transport and of preventing more than a 20% increase in the maximum <i>dose rate</i> at any external surface of the <i>tanks</i>.</li> </ul> <p>Paragraph 629. <i>Freight containers</i> with the characteristics of a permanent enclosure may also be used as <i>Type IP-2</i> or <i>Type IP-3</i>, provided that:</p> <ul style="list-style-type: none"> <li>(a) The <i>radioactive contents</i> are restricted to solid materials.</li> <li>(b) They satisfy the requirements for <i>Type IP-1</i> specified in para. 623.</li> <li>(c) They are designed to conform to the International Organization for Standardization document: Series 1 Freight containers — Specifications and Testing — Part 1: General Cargo Containers for General Purposes (ISO 14961) [9] excluding dimensions and ratings. They shall be so designed such that if subjected to the tests prescribed in that document, and to the accelerations occurring during routine conditions of transport, they would prevent: <ul style="list-style-type: none"> <li>(i) Loss or dispersal of the <i>radioactive contents</i>;</li> <li>(ii) More than a 20% increase in the maximum <i>dose rate</i> at any external surface of the <i>freight containers</i>.</li> </ul> </li> </ul> <p>Paragraph 630. Metal <i>IBCs</i> may also be used as <i>Type IP-2</i> or <i>Type IP-3</i>, provided that:</p> <ul style="list-style-type: none"> <li>(a) They satisfy the requirements for <i>Type IP-1</i> specified in para. 623.</li> <li>(b) They are designed to satisfy the requirements prescribed for UN Packing Group I or II in Chapter 6.5 of the United Nations Recommendations on the Transport of Dangerous Goods, Model Regulations [8], and if they were subjected to the tests prescribed in that document, but with the drop test conducted in the most damaging orientation, they would prevent: <ul style="list-style-type: none"> <li>(i) Loss or dispersal of the <i>radioactive contents</i>;</li> <li>(ii) More than a 20% increase in the maximum <i>dose rate</i> at any external surface of the <i>IBC</i>.</li> </ul> </li> </ul>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
(2) For the purposes of these Regulations, the incorporation by reference of any particular amendment of the <b>IAEA Regulations</b> is effective two years after the day on which the amendment is initially published by the IAEA or six months after the day on which the amendment is available in both of the official languages of Canada, whichever is later.	
(3) The Commission must note the effective date of the incorporation by reference on its website.	The PTNSR 2015 incorporate by reference the 2018 Edition of the IAEA <i>Regulations for the Safe Transport of Radioactive Material</i> . Please consult the CNSC <a href="#">website</a> for the effective date of the incorporation by reference of the IAEA Regulations.
(4) In the French version of these Regulations, (a) other than in paragraphs 6(1)(f), 7(h) and 11(3)(f) and subparagraph 26(1)(b)(iv), "approbation" is to be read to include "certificat d'agrément" and "certificat d'approbation" as used in the <b>IAEA Regulations</b> ; and (b) "approuvé" is to be read to include "agrée" as used in the <b>IAEA Regulations</b> .	
(5) In the English version of these Regulations, other than in paragraphs 6(1)(f), 7(h), 11(3)(f) and subparagraph 26(1)(b)(iv), "approval" means "certificate of approval" as used in the <b>IAEA Regulations</b> .	
<b>APPLICATION</b>	
2. (1) Subject to subsection (2), these Regulations apply to the packaging and transport of (a) prescribed equipment; and (b) nuclear substances, including (i) the design, production, use, inspection, maintenance and repair of packaging and packages for nuclear substances, and (ii) the preparation, consigning, handling, loading, carriage, storage during transport, receipt at final destination and unloading of packages and unpacking of their contents.	
(2) These Regulations, except for sections 6 and 7, do not apply to the packaging and transport of a nuclear substance (a) that is naturally occurring, provided that it has (i) a specific activity that is less than or equal to 70 kBq/kg, or (ii) an activity concentration that does not exceed 10 times the activity concentration limit for exempt material values set out in the <b>IAEA Regulations</b> ;	See Table 2, column 4 of the IAEA Regulations. <b>DETERMINATION OF BASIC RADIONUCLIDE VALUES</b> Paragraph 403. For individual radionuclides: (a) That are not listed in Table 2, the determination of the basic radionuclide values referred to in para. 402 shall require <i>multilateral approval</i> . For these radionuclides, activity concentrations for exempt material and activity limits for exempt <i>consignments</i> shall be calculated in accordance with the principles established in the GSR Part 3 [7]. It is permissible to use an $A_2$ value calculated using a dose coefficient for the appropriate lung absorption type, as recommended by the

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	<p>International Commission on Radiological Protection, if the chemical forms of each radionuclide under both normal and accident conditions of transport are taken into consideration. Alternatively, the radionuclide values in Table 3 may be used without obtaining <i>competent authority approval</i>.</p> <p>(b) In instruments or articles in which the <i>radioactive material</i> is enclosed in or is included as a component part of the instrument or other manufactured article and which meets para. 423(c), alternative basic radionuclide values to those in Table 2 for the activity limit for an exempt <i>consignment</i> are permitted and shall require <i>multilateral approval</i>. Such alternative activity limits for an exempt <i>consignment</i> shall be calculated in accordance with the principles set out in the GSR Part 3 [7].</p> <p>Paragraph 405. For mixtures of radionuclides, the basic radionuclide values referred to in para. 402 may be determined as follows:</p> $X_m = \frac{1}{\sum_i \frac{f(i)}{X(i)}}$ <p>where</p> <p><math>f(i)</math> is the fraction of activity or activity concentration of radionuclide <math>i</math> in the mixture.</p> <p><math>X(i)</math> is the appropriate value of <math>A_1</math> or <math>A_2</math>, or the activity concentration limit for exempt material or the activity limit for an exempt <i>consignment</i> as appropriate for radionuclide <math>i</math>.</p> <p><math>X_m</math> is the derived value of <math>A_1</math> or <math>A_2</math>, or the activity concentration limit for exempt material or the activity limit for an exempt <i>consignment</i> in the case of a mixture.</p> <p>Paragraph 406. When the identity of each radionuclide is known but the individual activities of some of the radionuclides are not known, the radionuclides may be grouped and the lowest radionuclide value, as appropriate for the radionuclides in each group, may be used in applying the formulas in paras 405 and 430. Groups may be based on the total alpha activity and the total beta/gamma activity when these are known, using the lowest radionuclide values for the alpha emitters or beta/gamma emitters, respectively.</p> <p>Paragraph 407. For individual radionuclides or for mixtures of radionuclides for which relevant data are not available, the values shown in Table 3 shall be used.</p>
<p>(b) that was implanted in or administered to a person or an animal for medical diagnosis or treatment purposes, or that subsists in their remains;</p> <p>(c) that is contained in a sample of material taken for bioassay purposes;</p>	

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
(d) that is used by a holder of a licence on private property for the purpose of an activity described in paragraphs 26(a) to (c) of the <b>Act</b> that the licence authorizes the holder to carry on, if access to the property is controlled;	<p><a href="#"><u>Nuclear Safety and Control Act</u></a></p> <p>26. Subject to the regulations, no person shall, except in accordance with a licence,</p> <p>(a) possess, transfer, import, export, use or abandon a nuclear substance, prescribed equipment or prescribed information;</p> <p>(b) mine, produce, refine, convert, enrich, process, reprocess, package, transport, manage, store or dispose of a nuclear substance;</p> <p>(c) produce or service prescribed equipment;</p>
(e) that is contained in human or animal tissue samples or animal remains, or a liquid scintillation medium, if the specific activity of the nuclear substance averaged over the mass of the material does not exceed $10^{-6}$ A <sub>2</sub> /kg;	
(f) that is contained in a product for which no licence is required under sections 6 to 8 of the <b>Nuclear Substances and Radiation Devices Regulations</b> following the sale of the product to an end user;	<p><a href="#"><u>Nuclear Substances and Radiation Devices Regulations</u></a></p> <p>SMOKE DETECTORS</p> <p>6. A person may, without a licence to carry on that activity, possess, transfer, use or abandon a smoke detector that contains a nuclear substance, if</p> <p>(a) the smoke detector does not contain more than 185 kBq of americium 241 or, where it is in a commercial or industrial facility, more than 740 kBq of americium 241;</p> <p>(b) the radiation dose rate does not exceed 1 µSv per hour at 0.1 m from any of the accessible surfaces of the smoke detector;</p> <p>(c) the design and construction of the smoke detector prevent persons from making direct contact with the nuclear substance that it contains under normal conditions of use;</p> <p>(d) all markings and labels on the smoke detector are legible;</p> <p>(e) the radioactive nuclear substance contained in the smoke detector is a sealed source that, when it is mounted in its holder, conforms to International Standard 2919, Radiation Protection — Sealed radioactive sources — General requirements and classification (1999), of the International Organization for Standardization; and</p> <p>(f) the smoke detector meets the tests specified in the annex entitled Prototype Tests of the Recommendations for ionization chamber smoke detectors in implementation of radiation protection standards (1977) of the Nuclear Energy Agency of the Organisation for Economic Co-operation and Development.</p> <p>TRITIUM SAFETY SIGNS</p> <p>7. A person may, without a licence to carry on that activity, possess, transfer, use or abandon a tritium-activated self-luminous safety sign if</p> <p>(a) the only nuclear substance contained in the safety sign is tritium;</p> <p>(b) the safety sign contains no more than 925 GBq of tritium in gaseous form;</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	<p>(c) the light-emitting component containing the tritium consists of glass tubes that are enclosed in a sturdy metal or plastic frame mounted in a manner that prevents the dismantlement and removal of the glass tubes;</p> <p>(d) the amount of tritium present in the form of oxide does not exceed 1 per cent per volume for each glass tube;</p> <p>(e) the safety sign conforms to ANSI/HPS N43.4-2000, <i>Classification of Radioactive Self-Luminous Light Sources</i>, of the American National Standards Institute/Health Physics Society, or to Standard MIL-STD-810F, 2000, <i>Department of Defense Test Method Standard for Environmental Engineering Considerations and Laboratory Tests</i>, of the United States Department of Defense; and</p> <p>(f) the safety sign, if it is manufactured after the coming into force of this paragraph, is marked with the name and quantity in becquerels of the nuclear substance, the manufacturer's recommended expiry date for the sign and the date of manufacture of the sign.</p> <p>Devices Containing Radium Luminous Compounds</p> <p>8. A person may, without a licence to carry on that activity, possess, transfer or use a device that contains a nuclear substance, if</p> <p>(a) the only nuclear substance contained in the device is a radium luminous compound;</p> <p>(b) the person does not possess more than 10 such devices; and</p> <p>(c) the device is not disassembled or tampered with.</p>
(g) that is an integral part of a conveyance and is required for transport purposes;	
<p>(h) that has an activity concentration that does not exceed the values for an exempt material set out in the <b>IAEA Regulations</b> or in a certificate for a basic radionuclide value that is not listed in the <b>IAEA Regulations</b>;</p> <p>(i) that is in a consignment that has a total activity that does not exceed the values for an activity limit for an exempt consignment set out in the <b>IAEA Regulations</b>, in a certificate for a basic radionuclide value that is not listed in the <b>IAEA Regulations</b> or in a certificate for an instrument or article that has an alternative activity limit for an exempt consignment;</p>	<p>See Table 2, column 4 of the IAEA Regulations.</p> <p>DETERMINATION OF BASIC RADIONUCLIDE VALUES</p> <p>Paragraph 403. For individual radionuclides:</p> <p>(a) That are not listed in Table 2, the determination of the basic radionuclide values referred to in para. 402 shall require <i>multilateral approval</i>. For these radionuclides, activity concentrations for exempt material and activity limits for exempt <i>consignments</i> shall be calculated in accordance with the principles established in the GSR Part 3 [7]. It is permissible to use an <math>A_2</math> value calculated using a dose coefficient for the appropriate lung absorption type, as recommended by the International Commission on Radiological Protection, if the chemical forms of each radionuclide under both normal and accident conditions of transport are taken into consideration. Alternatively, the radionuclide values in Table 3 may be used without obtaining <i>competent authority approval</i>.</p> <p>(b) In instruments or articles in which the <i>radioactive material</i> is enclosed in or is included as a component part of the instrument or other manufactured article and which meets para. 423(c), alternative</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	<p>basic radionuclide values to those in Table 2 for the activity limit for an exempt <i>consignment</i> are permitted and shall require <i>multilateral approval</i>. Such alternative activity limits for an exempt <i>consignment</i> shall be calculated in accordance with the principles set out in the GSR Part 3 [7].</p> <p>Paragraph 405. For mixtures of radionuclides, the basic radionuclide values referred to in para. 402 may be determined as follows:</p> $X_m = \frac{1}{\sum_i \frac{f(i)}{X(i)}}$ <p>where</p> <p><math>f(i)</math> is the fraction of activity or activity concentration of radionuclide <math>i</math> in the mixture.</p> <p><math>X(i)</math> is the appropriate value of <math>A_1</math> or <math>A_2</math>, or the activity concentration limit for exempt material or the activity limit for an exempt <i>consignment</i> as appropriate for radionuclide <math>i</math>.</p> <p><math>X_m</math> is the derived value of <math>A_1</math> or <math>A_2</math>, or the activity concentration limit for exempt material or the activity limit for an exempt <i>consignment</i> in the case of a mixture.</p> <p>Paragraph 406. When the identity of each radionuclide is known but the individual activities of some of the radionuclides are not known, the radionuclides may be grouped and the lowest radionuclide value, as appropriate for the radionuclides in each group, may be used in applying the formulas in paras 405 and 430. Groups may be based on the total alpha activity and the total beta/gamma activity when these are known, using the lowest radionuclide values for the alpha emitters or beta/gamma emitters, respectively.</p> <p>Paragraph 407. For individual radionuclides or for mixtures of radionuclides for which relevant data are not available, the values shown in Table 3 shall be used.</p>
(j) that is contained in a check source for which no licence is required under section 8.1 of the <b>Nuclear Substances and Radiation Devices Regulations</b> following the sale of the check source to an end user;	<p><a href="#"><u>Nuclear Substances and Radiation Devices Regulations</u></a></p> <p>CHECK SOURCES</p> <p>8.1 A person may, without a licence to carry on that activity, possess, transfer, store, use or abandon a check source that contains a radioactive nuclear substance and that is designed to verify the response of an instrument when exposed to the radiation output of the check source, if</p> <p>(a) the check source contains</p> <p>(i) not more than 370 kBq of a nuclear substance and the substance, or its short-lived radioactive progeny, does not emit alpha radiation, or</p> <p>(ii) not more than 3.7 kBq of a nuclear substance if the atomic number of the substance is greater than 81 and the substance, or its short-lived radioactive progeny, emits alpha radiation;</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	<p>(b) the radiation dose rate does not exceed 1 <math>\mu\text{Sv}</math> per hour at 0.1 m from any of the accessible surfaces of the check source;</p> <p>(c) the design and construction of the check source, under normal conditions of use, prevent persons from making direct contact with the nuclear substance that it contains;</p> <p>(d) all markings and labels on the check source or exterior packaging are legible;</p> <p>(e) the radioactive nuclear substance in the check source, when it is mounted in its holder, conforms to International Standard 2919, <i>Radiation Protection — Sealed radioactive sources — General requirements and classification</i> (1999), of the International Organization for Standardization; and</p> <p>(f) the check source, if it is a sealed source, meets the tests specified in ANSI/HPS N43.6-1997, <i>Sealed Radioactive Sources — Classification</i>, of the American National Standards Institute/Health Physics Society.</p>
<p>(k) that is contained in a radiation device for which no licence is required under paragraph 5(1)(c) of the <b><i>Nuclear Substances and Radiation Devices Regulations</i></b> following the sale of the device to an end user;</p>	<p><a href="#"><u><i>Nuclear Substances and Radiation Devices Regulations</i></u></a></p> <p>5. (1) A person may carry on any of the following activities without a licence: [...]</p> <p>(c) possess, transfer, import, export, store, use or abandon a radiation device, other than an exposure device, if the quantity of the nuclear substance or substances contained in the device is less than 10 times the exemption quantity;</p>
<p>(l) that consists of non-radioactive solid objects with radioactive material present on any surface in quantities not exceeding 0.4 Bq/cm<sup>2</sup> for beta and gamma emitters and low toxicity alpha emitters and 0.04 Bq/cm<sup>2</sup> for all other alpha emitters;</p> <p>(m) that is in or on a person who is transported for medical treatment because the person has been subject to an accidental or deliberate intake or contamination;</p> <p>(n) that is present in a load of waste that is in transport, is not classified as radioactive material and has triggered a radiation monitor alarm if the nuclear substance in the load has been determined only to be one or more of the following medical isotopes and if there is no loss or dispersal of the material during the transport:</p> <ul style="list-style-type: none"> <li>(i) Chromium 51,</li> <li>(ii) Indium 111,</li> <li>(iii) Iodine 123, 124 or 131,</li> <li>(iv) Gallium 67,</li> <li>(v) Technetium 99m,</li> <li>(vi) Thallium 201;</li> </ul>	

<b><i>Packaging and Transport of Nuclear Substances Regulations, 2015</i></b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
<p>(o) that is being transported to a location for proper characterization in accordance with section 3, if</p> <ul style="list-style-type: none"> <li>(i) it is present in a load that was already in transport,</li> <li>(ii) it is not classified as radioactive material,</li> <li>(iii) it has triggered a radiation monitor alarm and the maximum dose rate on any external surface of the vehicle that is transporting it is less than or equal to 500 <math>\mu\text{Sv/h}</math>, and</li> <li>(iv) there is no loss or dispersal of the material during the transport; or</li> </ul> <p>(p) that is being transported by a peace officer to a location for proper characterization, if</p> <ul style="list-style-type: none"> <li>(i) it is a forensic sample,</li> <li>(ii) the peace officer has reason to believe that it is radioactive material,</li> <li>(iii) the maximum dose rate on contact is less than or equal to 2mSv/h on any external surface of the container,</li> <li>(iv) there is no loss or dispersal of the material during the transport, and</li> <li>(v) the Commission is advised immediately of the transport.</li> </ul>	
<p>3. (1) The nuclear substance referred to in paragraph 2(2)(o) must be characterized at the earliest possible time to determine the extent to which it is subject to these Regulations and the <b><i>Nuclear Substances and Radiation Devices Regulations</i></b>.</p>	<p><a href="#"><u><i>Nuclear Substances and Radiation Devices Regulations</i></u></a></p>
<p>(2) For the purpose of this section, a licensable quantity of a nuclear substance is a quantity</p> <ul style="list-style-type: none"> <li>(a) in respect of which the activity exceeds the exemption quantity, as defined in section 1 of the <b><i>Nuclear Substances and Radiation Devices Regulations</i></b>; or</li> </ul>	<p><a href="#"><u><i>Nuclear Substances and Radiation Devices Regulations</i></u></a></p> <p>“exemption quantity” means any of the following:</p> <ul style="list-style-type: none"> <li>(a) in respect of a radioactive nuclear substance set out in column 1 of Schedule 1, <ul style="list-style-type: none"> <li>(i) if the radioactive nuclear substance is uniformly distributed in material and not in bulk quantity, the corresponding activity concentration set out in column 2, or</li> <li>(ii) the corresponding activity set out in column 3;</li> </ul> </li> <li>(b) in respect of a radioactive nuclear substance that is not set out in column 1 of Schedule 1, <ul style="list-style-type: none"> <li>(i) if the atomic number of the substance is equal to or less than 81, <ul style="list-style-type: none"> <li>(A) 10 Bq/g if the radioactive nuclear substance is uniformly distributed in material and not in bulk quantity, or</li> <li>(B) 10,000 Bq,</li> </ul> </li> </ul> </li> </ul>



<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	<p>(ii) if the atomic number of the substance is greater than 81 and the substance, or its short-lived radioactive progeny, does not emit alpha radiation,</p> <p>(A) 10 Bq/g if the radioactive nuclear substance is uniformly distributed in material and not in bulk quantity, or</p> <p>(B) 10,000 Bq, or</p> <p>(iii) if the atomic number of the substance is greater than 81 and the substance, or its short-lived radioactive progeny, emits alpha radiation,</p> <p>(A) 1 Bq/g if the radioactive nuclear substance is uniformly distributed in material and not in bulk quantity, or</p> <p>(B) 1,000 Bq; or</p> <p>(c) in respect of more than one radioactive nuclear substance,</p> <p>(i) if the radioactive nuclear substances are uniformly distributed in material and not in bulk quantity, the quotient obtained by dividing the total activity concentration by the sum of quotients obtained by dividing the activity concentration of each radioactive nuclear substance by its corresponding exemption quantity as referred to in paragraph (a) or (b), or</p> <p>(ii) the quotient obtained by dividing the total activity by the corresponding sum of quotients obtained by dividing the activity of each radioactive nuclear substance by its corresponding exemption quantity as referred to in paragraph (a) or (b). (<i>quantité d'exemption</i>)</p>
<p>(b) in respect of which there is no exemption from licensing under sections 5 to 8.1 of <b>those Regulations</b>.</p>	<p><a href="#"><u>Nuclear Substances and Radiation Devices Regulations</u></a></p> <p>EXEMPTIONS FROM LICENCE REQUIREMENT GENERAL EXEMPTED ACTIVITIES</p> <p>5. (1) A person may carry on any of the following activities without a licence:</p> <p>(a) possess, transfer, import, export, use, mine, produce, refine, convert, enrich, process, reprocess, manage or store a radioactive nuclear substance if the activity or the activity concentration of the substance does not, at any one time, exceed</p> <p>(i) its exemption quantity,</p> <p>(ii) its conditional clearance level, or</p> <p>(iii) its unconditional clearance level;</p> <p>(b) possess, transfer, import, export, store, use, abandon, produce or service a sealed source that contains less than the exemption quantity of a radioactive nuclear substance;</p> <p>(c) possess, transfer, import, export, store, use or abandon a radiation device, other than an exposure device, if the quantity of the nuclear substance or substances contained in the device is less than 10 times the exemption quantity;</p> <p>(d) possess, transfer, store, use, abandon, produce, refine, convert, enrich, process, reprocess, manage or dispose of deuterium or a</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	<p>compound containing deuterium, if the quantity of deuterium is less than 10 kg in any calendar year;</p> <p>(e) possess, transfer, store, use or manage depleted uranium, in any quantity, when used as counterweights in aircraft and</p> <p>(i) each counterweight manufactured after the coming into force of this subparagraph is durably and legibly impressed with the words "DEPLETED URANIUM APPAUVRI" and the words are visible through any plating or other covering,</p> <p>(ii) each counterweight manufactured after the coming into force of this subparagraph is durably and legibly labelled or impressed with the name of the manufacturer and its unique identification number and the statement "UNAUTHORIZED ALTERATIONS PROHIBITED / MODIFICATIONS INTERDITES SANS AUTORISATION", and</p> <p>(iii) no chemical, physical or metallurgical treatment or processing of the counterweights is done other than for the repair or restoration of any plating or other covering; or</p> <p>(f) possess, transfer, use or abandon material that contains not more than 10 kg of depleted uranium, natural uranium or natural thorium in any calendar year and that is not used for its radiation properties.</p> <p>(2) Subsection (1) does not apply in respect of Category I, II or III nuclear material, as defined in section 1 of the <a href="#">Nuclear Security Regulations</a>.</p> <p>(3) Paragraphs (1)(a) to (c) do not apply in respect of the import or export of a nuclear substance, sealed source or radiation device to which the <a href="#">Nuclear Non-proliferation Import and Export Control Regulations</a> apply.</p> <p><b>ABANDONMENT OR DISPOSAL</b></p> <p>5.1 (1) A person may, without a licence, abandon or dispose of a radioactive nuclear substance if the activity or the activity concentration of the substance does not exceed</p> <p>(a) its exemption quantity;</p> <p>(b) its conditional clearance level; or</p> <p>(c) its unconditional clearance level.</p> <p>(2) Subsection (1) does not apply in respect of</p> <p>(a) Category I nuclear material, Category II nuclear material or Category III nuclear material, as those terms are defined in section 1 of the <a href="#">Nuclear Security Regulations</a>; or</p> <p>(b) discharges of effluents from</p> <p>(i) Class I nuclear facilities, as defined in section 1 of the Class I Nuclear Facilities Regulations, or</p> <p>(ii) mines or mills, as those terms are defined in section 1 of the Uranium Mines and Mills Regulations.</p> <p><b>SMOKE DETECTORS</b></p> <p>6. A person may, without a licence to carry on that activity, possess, transfer, use or abandon a smoke detector that contains a nuclear substance, if</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	<p>(a) the smoke detector does not contain more than 185 kBq of americium 241 or, where it is in a commercial or industrial facility, more than 740 kBq of americium 241;</p> <p>(b) the radiation dose rate does not exceed 1 µSv per hour at 0.1 m from any of the accessible surfaces of the smoke detector;</p> <p>(c) the design and construction of the smoke detector prevent persons from making direct contact with the nuclear substance that it contains under normal conditions of use;</p> <p>(d) all markings and labels on the smoke detector are legible;</p> <p>(e) the radioactive nuclear substance contained in the smoke detector is a sealed source that, when it is mounted in its holder, conforms to International Standard 2919, <i>Radiation Protection — Sealed radioactive sources — General requirements and classification</i> (1999), of the International Organization for Standardization; and</p> <p>(f) the smoke detector meets the tests specified in the annex entitled Prototype Tests of the <i>Recommendations for ionization chamber smoke detectors in implementation of radiation protection standards</i> (1977) of the Nuclear Energy Agency of the Organisation for Economic Co-operation and Development.</p> <p><b>TRITIUM SAFETY SIGNS</b></p> <p>7. A person may, without a licence to carry on that activity, possess, transfer, use or abandon a tritium-activated self-luminous safety sign if</p> <p>(a) the only nuclear substance contained in the safety sign is tritium;</p> <p>(b) the safety sign contains no more than 925 GBq of tritium in gaseous form;</p> <p>(c) the light-emitting component containing the tritium consists of glass tubes that are enclosed in a sturdy metal or plastic frame mounted in a manner that prevents the dismantlement and removal of the glass tubes;</p> <p>(d) the amount of tritium present in the form of oxide does not exceed 1 per cent per volume for each glass tube;</p> <p>(e) the safety sign conforms to ANSI/HPS N43.4-2000, <i>Classification of Radioactive Self-Luminous Light Sources</i>, of the American National Standards Institute/Health Physics Society, or to Standard MIL-STD-810F, 2000, <i>Department of Defense Test Method Standard for Environmental Engineering Considerations and Laboratory Tests</i>, of the United States Department of Defense; and</p> <p>(f) the safety sign, if it is manufactured after the coming into force of this paragraph, is marked with the name and quantity in becquerels of the nuclear substance, the manufacturer's recommended expiry date for the sign and the date of manufacture of the sign.</p> <p><b>DEVICES CONTAINING RADIUM LUMINOUS COMPOUNDS</b></p> <p>8. A person may, without a licence to carry on that activity, possess, transfer or use a device that contains a nuclear substance, if</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	<p>(a) the only nuclear substance contained in the device is a radium luminous compound;</p> <p>(b) the person does not possess more than 10 such devices; and</p> <p>(c) the device is not disassembled or tampered with.</p> <p>CHECK SOURCES</p> <p>8.1 A person may, without a licence to carry on that activity, possess, transfer, store, use or abandon a check source that contains a radioactive nuclear substance and that is designed to verify the response of an instrument when exposed to the radiation output of the check source, if</p> <p>(a) the check source contains</p> <p>(i) not more than 370 kBq of a nuclear substance and the substance, or its short-lived radioactive progeny, does not emit alpha radiation, or</p> <p>(ii) not more than 3.7 kBq of a nuclear substance if the atomic number of the substance is greater than 81 and the substance, or its short-lived radioactive progeny, emits alpha radiation;</p> <p>(b) the radiation dose rate does not exceed 1 µSv per hour at 0.1 m from any of the accessible surfaces of the check source;</p> <p>(c) the design and construction of the check source, under normal conditions of use, prevent persons from making direct contact with the nuclear substance that it contains;</p> <p>(d) all markings and labels on the check source or exterior packaging are legible;</p> <p>(e) the radioactive nuclear substance in the check source, when it is mounted in its holder, conforms to International Standard 2919, <i>Radiation Protection — Sealed radioactive sources — General requirements and classification</i> (1999), of the International Organization for Standardization; and</p> <p>(f) the check source, if it is a sealed source, meets the tests specified in ANSI/HPS N43.6-1997, <i>Sealed Radioactive Sources — Classification</i>, of the American National Standards Institute/Health Physics Society.</p>
<p>(3) The person who performs the characterization must</p> <p>(a) keep a record documenting the detection of the radiation and the disposal of the nuclear substance for two years;</p> <p>(b) file an annual report with the Commission by April 30 that contains a summary of radiation detections for the calendar year before the date of the report; and</p> <p>(c) immediately notify the Commission if the source of the radioactivity in the load is determined to be a licensable quantity of a nuclear substance.</p>	

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
<p>(4) If the measured dose rate at the time that the alarm is triggered is greater than 5 µSv/h and less than or equal to 25 µSv/h and there is no loss or dispersal of the nuclear substance during the transport, the consignor, the carrier and the consignee must</p> <p>(a) immediately make a preliminary report to the Commission indicating the alarm level, the details of the transport, information on the location and circumstances of the detected radiation and any action that they have taken or propose to take in respect of it; and</p> <p>(b) characterize the source of the radiation within 10 days after its detection and make a follow-up report</p> <p>(i) immediately, if the characterization of the source of the radioactivity in the load indicates that it is a licensable quantity of a nuclear substance, or</p> <p>(ii) within 21 days after the initial detection, if the nuclear substance in the load is determined not to be of a licensable quantity, with a summary of the radiation detection and the disposal of the substance and a confirmation that it is not of a licensable quantity.</p>	
<p>(5) If the measured dose rate at the time that the alarm is triggered is greater than 25 µSv/h but less than or equal to 500 µSv/h and there is no loss or dispersal of the nuclear substance during the transport, the consignor, carrier and consignee must</p> <p>(a) immediately make a preliminary report to the Commission indicating the alarm level, the details of the transport, information on the location and circumstances of the detected radiation and any action that they have taken or propose to take in respect of it;</p>	
<p>(b) isolate the load, prevent dispersal of the nuclear substance and control access to it to ensure that persons are not exposed to effective doses that exceed the limits set out in section 13 of the <b><i>Radiation Protection Regulations</i></b>;</p>	<p><a href="#"><u>Radiation Protection Regulations</u></a></p> <p>EFFECTIVE DOSE LIMITS</p> <p>13. (1) Every licensee shall ensure that the effective dose received by and committed to a person described in column 1 of an item of the table to this subsection, during the period set out in column 2 of that item, does not exceed the effective dose set out in column 3 of that item.</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>																		
	<p style="text-align: center;">TABLE</p> <table border="1" data-bbox="727 302 1515 646"> <thead> <tr> <th data-bbox="727 302 805 394">Item</th> <th data-bbox="805 302 1081 394">Column 1 Person</th> <th data-bbox="1081 302 1357 394">Column 2 Period</th> <th data-bbox="1357 302 1515 394">Column 3 Effective Dose (mSv)</th> </tr> </thead> <tbody> <tr> <td data-bbox="727 394 805 520">1.</td> <td data-bbox="805 394 1081 520">Nuclear energy worker, including a pregnant nuclear energy worker</td> <td data-bbox="1081 394 1357 520">(a) One-year dosimetry period (b) Five-year dosimetry period</td> <td data-bbox="1357 394 1515 520">50 100</td> </tr> <tr> <td data-bbox="727 520 805 583">2.</td> <td data-bbox="805 520 1081 583">Pregnant nuclear energy worker</td> <td data-bbox="1081 520 1357 583">Balance of the pregnancy</td> <td data-bbox="1357 520 1515 583">4</td> </tr> <tr> <td data-bbox="727 583 805 646">3.</td> <td data-bbox="805 583 1081 646">A person who is not a nuclear energy worker</td> <td data-bbox="1081 583 1357 646">One calendar year</td> <td data-bbox="1357 583 1515 646">1</td> </tr> </tbody> </table> <p data-bbox="727 695 1515 793">(2) For the purpose of item 1 of the table to subsection (1), the effective dose shall be calculated using the following formula and expressed in millisievert:</p> $E + 5RnP + 20 \sum \frac{I}{ALI}$ <p data-bbox="727 919 1515 1018">(3) For the purpose of item 2 of the table to subsection (1), the effective dose shall be calculated using the following formula and expressed in millisievert:</p> $E + 20 \sum \frac{I}{ALI}$ <p data-bbox="727 1155 1515 1253">(4) For the purpose of item 3 of the table to subsection (1), the effective dose shall be calculated using either of the following formulas and expressed in millisievert:</p> $E + \frac{Rn}{60} + 20 \sum \frac{I}{ALI}$ $E + 4RnP + 20 \sum \frac{I}{ALI}$ <p data-bbox="727 1564 1515 1795">(5) For the purpose of subsection (1), where the end of a dosimeter-wearing period or a bioassay-sampling period does not coincide with the end of a dosimetry period set out in column 2 of the table to that subsection, the licensee may extend or reduce the dosimetry period to a maximum of two weeks so that the end of the dosimetry period coincides with the end of the dosimeter-wearing period or bioassay-sampling period, as the case may be.</p>			Item	Column 1 Person	Column 2 Period	Column 3 Effective Dose (mSv)	1.	Nuclear energy worker, including a pregnant nuclear energy worker	(a) One-year dosimetry period (b) Five-year dosimetry period	50 100	2.	Pregnant nuclear energy worker	Balance of the pregnancy	4	3.	A person who is not a nuclear energy worker	One calendar year	1
Item	Column 1 Person	Column 2 Period	Column 3 Effective Dose (mSv)																
1.	Nuclear energy worker, including a pregnant nuclear energy worker	(a) One-year dosimetry period (b) Five-year dosimetry period	50 100																
2.	Pregnant nuclear energy worker	Balance of the pregnancy	4																
3.	A person who is not a nuclear energy worker	One calendar year	1																

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<p>(c) have an expert in radiation protection assess the situation; and</p> <p>(d) report the results of the assessment to the Commission within 10 days after the detection and make a follow-up report</p> <p>(i) immediately, if the characterization of the source of the radioactivity in the load indicates that it is a licensable quantity of a nuclear substance, or</p> <p>(ii) within 21 days after the initial detection, if the nuclear substance in the load is determined not to be of a licensable quantity, with a summary of the radiation detection and the disposal of the substance and a confirmation that it is not of a licensable quantity.</p>	
<b>CLASSIFICATION OF MATERIAL AND PACKAGES</b>	
<p>4. Subject to section 5, packages and radioactive material must be classified in accordance with the <b>IAEA Regulations</b>.</p>	<p><b>CLASSIFICATION OF MATERIAL</b></p> <p><u>Low specific activity material</u></p> <p>Paragraph 408. <i>Radioactive material</i> may only be classified as <i>LSA material</i> if the conditions of paras 226, 409–411 and 517–522 are met.</p> <p>Paragraph 410. A single <i>package</i> of non-combustible solid <i>LSA-II</i> or <i>LSA-III</i> material, if carried by air, shall not contain an activity greater than <math>3000A_2</math>.</p> <p>Paragraph 411. The <i>radioactive contents</i> in a single <i>package</i> of <i>LSA material</i> shall be so restricted that the <i>dose rate</i> specified in para. 517 shall not be exceeded, and the activity in a single <i>package</i> shall also be so restricted that the activity limits for a <i>conveyance</i> specified in para. 522 shall not be exceeded.</p> <p><u>Surface contaminated object</u></p> <p>Paragraph 412. <i>Radioactive material</i> may be classified as <i>SCO</i> if the conditions in paras 241, 413, 414 and 517–522 are met.</p> <p>Paragraph 413. <i>SCO</i> shall be in one of three groups:</p> <p>(a) <i>SCO-I</i>: A solid object on which:</p> <p>(i) The <i>non-fixed contamination</i> on the accessible surface averaged over <math>300\text{ cm}^2</math> (or the area of the surface if less than <math>300\text{ cm}^2</math>) does not exceed <math>4\text{ Bq/cm}^2</math> for beta and gamma emitters and <i>low toxicity alpha emitters</i>, or <math>0.4\text{ Bq/cm}^2</math> for all other alpha emitters.</p> <p>(ii) The <i>fixed contamination</i> on the accessible surface averaged over <math>300\text{ cm}^2</math> (or the area of the surface if less than <math>300\text{ cm}^2</math>) does not exceed <math>4 \times 10^4\text{ Bq/cm}^2</math> for beta and gamma emitters and <i>low toxicity alpha emitters</i>, or <math>4000\text{ Bq/cm}^2</math> for all other alpha emitters.</p> <p>(iii) The <i>non-fixed contamination</i> plus the <i>fixed contamination</i> on the inaccessible surface averaged over <math>300\text{ cm}^2</math> (or the area of the</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	<p>surface if less than 300 cm<sup>2</sup>) does not exceed <math>4 \times 10^4</math> Bq/cm<sup>2</sup> for beta and gamma emitters and <i>low toxicity alpha emitters</i>, or 4000 Bq/cm<sup>2</sup> for all other alpha emitters.</p> <p>(b) <i>SCO-II</i>: A solid object on which either the <i>fixed</i> or <i>non-fixed contamination</i> on the surface exceeds the applicable limits specified for SCO-I in (a) above and on which:</p> <p>(i) The <i>non-fixed contamination</i> on the accessible 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 400 Bq/cm<sup>2</sup> for beta and gamma emitters and <i>low toxicity alpha emitters</i>, or 40 Bq/cm<sup>2</sup> for all other alpha emitters.</p> <p>(ii) The <i>fixed contamination</i> on the accessible 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 <math>8 \times 10^5</math> Bq/cm<sup>2</sup> for beta and gamma emitters and <i>low toxicity alpha emitters</i>, or <math>8 \times 10^4</math> Bq/cm<sup>2</sup> for all other alpha emitters.</p> <p>(iii) The <i>non-fixed contamination</i> plus the <i>fixed contamination</i> 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 <math>8 \times 10^5</math> Bq/cm<sup>2</sup> for beta and gamma emitters and <i>low toxicity alpha emitters</i>, or <math>8 \times 10^4</math> Bq/cm<sup>2</sup> for all other alpha emitters.</p> <p>(c) <i>SCO-III</i>: A large solid object which, because of its size, cannot be transported in a type of <i>package</i> described in these Regulations and for which:</p> <p>(i) All openings are sealed to prevent release of <i>radioactive material</i> during conditions defined in para. 520(e);</p> <p>(ii) The inside of the object is as dry as practicable;</p> <p>(iii) The <i>non-fixed contamination</i> on the external surfaces does not exceed the limits specified in para. 508;</p> <p>(iv) The <i>non-fixed contamination</i> plus the <i>fixed contamination</i> on the inaccessible surface averaged over 300 cm<sup>2</sup> does not exceed <math>8 \times 10^5</math> Bq/cm<sup>2</sup> for beta and gamma emitters and <i>low toxicity alpha emitters</i>, or <math>8 \times 10^4</math> Bq/cm<sup>2</sup> for all other alpha emitters.</p> <p>Paragraph 414. The <i>radioactive contents</i> in a single <i>package</i> of SCO shall be so restricted that the <i>dose rate</i> specified in para. 517 shall not be exceeded, and the activity in a single <i>package</i> shall also be so restricted that the activity limits for a <i>conveyance</i> specified in para. 522 shall not be exceeded.</p> <p><u>Special form radioactive material</u></p> <p>Paragraph 415. <i>Radioactive material</i> may be classified as <i>special form radioactive material</i> only if it meets the requirements of paras 602–604 and 802.</p>



<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	<p><u>Low dispersible radioactive material</u></p> <p>Paragraph 416. <i>Radioactive material</i> may be classified as <i>low dispersible radioactive material</i> only if it meets the requirements of para. 605, taking into account the requirements of paras 665 and 802.</p> <p><u>Fissile material</u></p> <p>Paragraph 417. <i>Fissile material</i> and <i>packages</i> containing <i>fissile material</i> shall be classified under the relevant entry as "FISSILE", in accordance with Table 1 unless excepted by one of the provisions of subparagraphs (a)–(f) of this paragraph and transported subject to the requirements of para. 570. All provisions apply only to material in <i>packages</i> that meets the requirements of para. 636, unless unpackaged material is specifically allowed in the provision:</p> <p>(a) <i>Uranium</i> enriched in uranium-235 to a maximum of 1% by mass, and with a total plutonium and uranium-233 content not exceeding 1% of the mass of uranium-235, provided that the <i>fissile nuclides</i> are distributed essentially homogeneously throughout the material. In addition, if uranium-235 is present in metallic, oxide or carbide forms, it shall not form a lattice arrangement.</p> <p>(b) Liquid solutions of uranyl nitrate enriched in uranium-235 to a maximum of 2% by mass, with a total plutonium and uranium-233 content not exceeding 0.002% of the mass of <i>uranium</i>, and with a minimum nitrogen to <i>uranium</i> atomic ratio (N/U) of 2.</p> <p>(c) <i>Uranium</i> with a maximum <i>uranium</i> enrichment of 5% by mass of uranium-235 provided:</p> <p>(i) There is no more than 3.5 g of uranium-235 per <i>package</i>.</p> <p>(ii) The total plutonium and uranium-233 content does not exceed 1% of the mass of uranium-235 per <i>package</i>.</p> <p>(iii) Transport of the <i>package</i> is subject to the <i>consignment</i> limit provided in para. 570(c).</p> <p>(d) <i>Fissile nuclides</i> with a total mass not greater than 2.0 g per <i>package</i>, provided the <i>package</i> is transported subject to the <i>consignment</i> limit provided in para. 570(d).</p> <p>(e) <i>Fissile nuclides</i> with a total mass not greater than 45 g, either packaged or unpackaged, subject to the limits provided in para. 570(e).</p> <p>(f) A <i>fissile material</i> that meets the requirements of paras 570(b), 606 and 802.</p> <p>Paragraph 418. The contents of <i>packages</i> containing <i>fissile material</i> shall be as specified for the <i>package design</i>, either directly in these Regulations or in the certificate of <i>approval</i>.</p> <p><u>Uranium hexafluoride</u></p> <p>Paragraph 419. Uranium hexafluoride shall be assigned to one of the following UN numbers only:</p> <p>(a) UN 2977, RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, FISSILE;</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	<p>(b) UN 2978, RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, non-fissile or fissile-excepted;</p> <p>(c) UN 3507, URANIUM HEXAFLUORIDE, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE, less than 0.1 kg per <i>package</i>, non-fissile or fissile-excepted.</p> <p>Paragraph 420. The contents of a <i>package</i> containing uranium hexafluoride shall comply with the following requirements:</p> <p>(a) The mass of uranium hexafluoride shall not be different from that allowed for the <i>package design</i>.</p> <p>(b) The mass of uranium hexafluoride shall not be greater than a value that would lead to an ullage of less than 5% at the maximum temperature of the <i>package</i>, as specified for the plant systems where the <i>package</i> might be used.</p> <p>(c) The uranium hexafluoride shall be in solid form and the internal pressure shall not be above atmospheric pressure when presented for transport.</p> <p>CLASSIFICATION OF PACKAGES</p> <p>Paragraph 421. The quantity of <i>radioactive material</i> in a <i>package</i> shall not exceed the relevant limits for the <i>package</i> type as specified below.</p> <p><u>Classification as excepted package</u></p> <p>Paragraph 422. A <i>package</i> may be classified as an <i>excepted package</i> if it meets one of the following conditions:</p> <p>(a) It is an empty <i>package</i> having contained <i>radioactive material</i>;</p> <p>(b) It contains instruments or articles not exceeding the activity limits specified in Table 4;</p> <p>(c) It contains articles manufactured of <i>natural uranium, depleted uranium</i> or natural thorium;</p> <p>(d) It contains <i>radioactive material</i> not exceeding the activity limits specified in Table 4;</p> <p>(e) It contains less than 0.1 kg of uranium hexafluoride not exceeding the activity limits specified in column 4 of Table 4.</p> <p>[See the IAEA Regulations for Table 4, <i>Activity Limits for Excepted Packages</i>.]</p> <p>Paragraph 423. <i>Radioactive material</i> that is enclosed in or is included as a component part of an instrument or other manufactured article, may be classified under UN 2911, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE — INSTRUMENTS or ARTICLES, provided that:</p> <p>(a) The <i>dose rate</i> at 10 cm from any point on the external surface of any unpackaged instrument or article is not greater than 0.1 mSv/h.</p> <p>(b) Each instrument or article bears the marking "RADIOACTIVE" on its external surface except for the following:</p> <p>(i) Radioluminescent timepieces or devices do not require marks.</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	<p>(ii) Consumer products that have either received regulatory <i>approval</i> in accordance with para. 107(e) or do not individually exceed the activity limit for an exempt <i>consignment</i> in Table 2 (column 5) do not require markings, provided that such products are transported in a <i>package</i> that bears the marking "RADIOACTIVE" on its internal surface in such a manner that a warning of the presence of <i>radioactive material</i> is visible on opening the <i>package</i>.</p> <p>(iii) Other instruments or articles too small to bear the mark "RADIOACTIVE" do not require markings, provided that they are transported in a <i>package</i> that bears the mark "RADIOACTIVE" on its internal surface in such a manner that a warning of the presence of <i>radioactive material</i> is visible on opening the <i>package</i>.</p> <p>(c) The active material is completely enclosed by non-active components (a device performing the sole function of containing <i>radioactive material</i> shall not be considered to be an instrument or manufactured article).</p> <p>(d) The limits specified in columns 2 and 3 of Table 4 are met for each individual item and each <i>package</i>, respectively.</p> <p>(e) For transport by post, the total activity in each <i>excepted package</i> shall not exceed one tenth of the relevant limits specified in column 3 of Table 4.</p> <p>(f) If the <i>package</i> contains <i>fissile material</i>, one of the provisions of subparagraphs (a)–(f) of para. 417 shall apply.</p> <p>Paragraph 424. <i>Radioactive material</i> in forms other than as specified in para. 423 and with an activity not exceeding the limits specified in column 4 of Table 4 may be classified under UN 2910, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE — LIMITED QUANTITY OF MATERIAL, provided that:</p> <p>(a) The <i>package</i> retains its <i>radioactive contents</i> under routine conditions of transport.</p> <p>(b) The <i>package</i> bears the marking "RADIOACTIVE" on either:</p> <p>(i) An internal surface in such a manner that a warning of the presence of <i>radioactive material</i> is visible on opening the <i>package</i>; or</p> <p>(ii) The outside of the <i>package</i>, where it is impractical to mark an internal surface.</p> <p>(c) For transport by post, the total activity in each <i>excepted package</i> shall not exceed one tenth of the relevant limits specified in column 4 of Table 4.</p> <p>(d) If the <i>package</i> contains <i>fissile material</i>, one of the provisions of subparagraphs (a)–(f) of para. 417 shall apply.</p> <p>Paragraph 425. Uranium hexafluoride not exceeding the limits specified in column 4 of Table 4 may be classified under UN 3507 URANIUM HEXAFLUORIDE, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE, less than 0.1 kg per <i>package</i>, non-fissile or fissile-excepted, provided that:</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	<p>(a) The mass of uranium hexafluoride in the <i>package</i> is less than 0.1 kg.</p> <p>(b) The conditions of paras 420, 424(a) and 424(b) are met.</p> <p>Paragraph 426. Articles manufactured of <i>natural uranium</i>, <i>depleted uranium</i> or natural thorium and articles in which the sole <i>radioactive material</i> is unirradiated <i>natural uranium</i>, unirradiated <i>depleted uranium</i> or unirradiated natural thorium may be classified under UN 2909, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE — ARTICLES MANUFACTURED FROM NATURAL URANIUM or DEPLETED URANIUM or NATURAL THORIUM, provided that the outer surface of the <i>uranium</i> or thorium is enclosed in an inactive sheath made of metal or some other substantial material.</p> <p><u>Additional requirements and controls for transport of empty packagings</u></p> <p>Paragraph 427. An empty <i>packaging</i> that had previously contained <i>radioactive material</i> may be classified under UN 2908, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE — EMPTY PACKAGING, provided that:</p> <p>(a) It is in a well-maintained condition and securely closed.</p> <p>(b) The outer surface of any <i>uranium</i> or thorium in its structure is covered with an inactive sheath made of metal or some other substantial material.</p> <p>(c) The level of internal <i>non-fixed contamination</i> does not exceed 100 times the levels specified in para. 508.</p> <p>(d) Any labels that may have been displayed on it in conformity with para. 538 are no longer visible.</p> <p>(e) If the <i>packaging</i> has contained <i>fissile material</i>, one of the provisions of subparagraphs (a)–(f) of para. 417 or one of the provisions for exclusion in para. 222 shall apply.</p> <p><u>Classification as Type A package</u></p> <p>Paragraph 428. <i>Packages</i> containing <i>radioactive material</i> may be classified as <i>Type A packages</i> provided that the conditions of paras 429 and 430 are met.</p> <p>Paragraph 429. <i>Type A packages</i> shall not contain activities greater than either of the following:</p> <p>(a) For <i>special form radioactive material</i> — <math>A_1</math>;</p> <p>(b) For all other <i>radioactive material</i> — <math>A_2</math>.</p> <p>Paragraph 430. For mixtures of radionuclides whose identities and respective activities are known, the following condition shall apply to the <i>radioactive contents</i> of a <i>Type A package</i>:</p> $\sum_i \frac{B(i)}{A_1(i)} + \sum_j \frac{C(j)}{A_2(j)} \leq 1$ <p>Where</p> <p><math>B(i)</math> is the activity of radionuclide <math>i</math> as <i>special form radioactive material</i>;</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	<p><math>A_1(i)</math> is the <math>A_1</math> value for radionuclide <math>i</math>;</p> <p><math>C(j)</math> is the activity of radionuclide <math>j</math> as other than <i>special form radioactive material</i>;</p> <p><math>A_2(j)</math> is the <math>A_2</math> value for radionuclide <math>j</math>.</p> <p><u>Classification as Type B(U), Type B(M) or Type C package</u></p> <p>Paragraph 431. <i>Type B(U), Type B(M) and Type C packages shall be classified in accordance with the competent authority certificate of approval for the package design issued by the country of origin of design.</i></p> <p>Paragraph 432. The contents of a <i>Type B(U), Type B(M) or Type C package</i> shall be as specified in the certificate of approval.</p> <p>Paragraph 433. <i>Type B(U) and Type B(M) packages, if transported by air, shall meet the requirements of para. 432 and shall not contain activities greater than the following:</i></p> <p>(a) For <i>low dispersible radioactive material</i> — as authorized for the <i>package design</i> as specified in the certificate of approval;</p> <p>(b) For <i>special form radioactive material</i> — <math>3000A_1</math> or <math>10^5A_2</math>, whichever is the lower;</p> <p>(c) For all other <i>radioactive material</i> — <math>3000A_2</math>.</p> <p><b>SPECIAL ARRANGEMENT</b></p> <p>Paragraph 434. <i>Radioactive material</i> shall be classified as transported under <i>special arrangement</i> when it is intended to be carried in accordance with para. 310.</p>
<p>5. (1) LSA material is classified as LSA-I material if it is either non-fissile material or fissile-excepted radioactive material and if it consists of</p> <p>(a) ores that contain naturally occurring radionuclides with a uranium and thorium concentration not greater than 3% by mass;</p> <p>(b) radioactive material for which the <math>A_2</math> value is unlimited, except for ores that contain naturally occurring radionuclides with a uranium and thorium concentration greater than 3% by mass;</p>	
<p>(c) concentrates of unirradiated thorium, of natural uranium or of depleted uranium, as those terms are defined in the <b>IAEA Regulations</b>, or their unirradiated compounds or mixtures in solid or liquid form;</p>	<p>Paragraph 245. <i>Unirradiated thorium</i> shall mean thorium containing not more than <math>10^{-7}</math> g of uranium-233 per gram of thorium-232.</p> <p>Paragraph 247. <i>Natural uranium</i> shall mean <i>uranium</i> (which may be chemically separated) containing the naturally occurring distribution of <i>uranium</i> isotopes (approximately 99.28% uranium-238 and 0.72% uranium-235, by mass).</p> <p><i>Depleted uranium</i> shall mean <i>uranium</i> containing a lesser mass percentage of uranium-235 than <i>natural uranium</i>.</p> <p><i>Enriched uranium</i> shall mean <i>uranium</i> containing a greater mass percentage of uranium-235 than 0.72%. In all cases, a very small mass percentage of uranium-234 is present.</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
(d) any mill tailings, contaminated earth, concrete, rubble, other debris and activated materials in which the radioactive material is essentially uniformly distributed and for which the average specific activity does not exceed $10^{-6} A_2/g$ ; or	
(e) other radioactive material in which the activity is distributed throughout and for which the estimated average specific activity does not exceed 30 times the activity concentration limit for exempt material values set out in the <b>IAEA Regulations</b> or in a certificate for a basic radionuclide value that is not listed in those Regulations.	<p><b>BASIC RADIONUCLIDE VALUES</b></p> <p>Paragraph 402. The following basic values for individual radionuclides are given in Table 2:</p> <ul style="list-style-type: none"> <li>(a) <math>A_1</math> and <math>A_2</math> in TBq;</li> <li>(b) Activity concentration limits for exempt material in Bq/g;</li> <li>(c) Activity limits for exempt <i>consignments</i> in Bq.</li> </ul> <p><b>DETERMINATION OF BASIC RADIONUCLIDE VALUES</b></p> <p>Paragraph 403. For individual radionuclides:</p> <ul style="list-style-type: none"> <li>(a) That are not listed in Table 2, the determination of the basic radionuclide values referred to in para. 402 shall require <i>multilateral approval</i>. For these radionuclides, activity concentrations for exempt material and activity limits for exempt <i>consignments</i> shall be calculated in accordance with the principles established in GSR Part 3 [7]. It is permissible to use an <math>A_2</math> value calculated using a dose coefficient for the appropriate lung absorption type, as recommended by the International Commission on Radiological Protection, if the chemical forms of each radionuclide under both normal and accident conditions of transport are taken into consideration. Alternatively, the radionuclide values in Table 3 may be used without obtaining <i>competent authority approval</i>.</li> <li>(b) In instruments or articles in which the <i>radioactive material</i> is enclosed in or is included as a component part of the instrument or other manufactured article and which meets para. 423(c), alternative basic radionuclide values to those in Table 2 for the activity limit for an <i>exempt consignment</i> are permitted and shall require <i>multilateral approval</i>. Such alternative activity limits for an <i>exempt consignment</i> shall be calculated in accordance with the principles set out in GSR Part 3 [7].</li> </ul> <p>Paragraph 404. In the calculations of <math>A_1</math> and <math>A_2</math> for a radionuclide not listed in Table 2, a single radioactive decay chain in which the radionuclides are present in their naturally occurring proportions, and in which no daughter nuclide has a half-life either longer than 10 days or longer than that of the parent nuclide, shall be considered as a single radionuclide; and the activity to be taken into account and the <math>A_1</math> or <math>A_2</math> value to be applied shall be that corresponding to the parent nuclide of that chain. In the case of radioactive decay chains in which any daughter nuclide has a half-life either longer than 10 days or longer than that of the parent nuclide, the parent and such daughter nuclides shall be considered as mixtures of different nuclides.</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	<p>Paragraph 405. For mixtures of radionuclides, the basic radionuclide values referred to in para. 402 may be determined as follows:</p> $X_m = \frac{1}{\sum_i \frac{f(i)}{X(i)}}$ <p>where</p> <p><math>f(i)</math> is the fraction of activity or activity concentration of radionuclide <math>i</math> in the mixture.</p> <p><math>X(i)</math> is the appropriate value of <math>A_1</math> or <math>A_2</math>, or the activity concentration limit for exempt material or the activity limit for an exempt <i>consignment</i> as appropriate for the radionuclide <math>i</math>.</p> <p><math>X_m</math> is the derived value of <math>A_1</math> or <math>A_2</math>, or the activity concentration limit for exempt material or the activity limit for an exempt <i>consignment</i> in the case of a mixture.</p> <p>Paragraph 406. When the identity of each radionuclide is known but the individual activities of some of the radionuclides are not known, the radionuclides may be grouped and the lowest radionuclide value, as appropriate for the radionuclides in each group, may be used in applying the formulas in paras 405 and 430. Groups may be based on the total alpha activity and the total beta/gamma activity when these are known, using the lowest radionuclide values for the alpha emitters or beta/gamma emitters, respectively.</p> <p>Paragraph 407. For individual radionuclides or for mixtures of radionuclides for which relevant data are not available, the values shown in Table 3 shall be used.</p>
<p>(2) LSA material is classified as LSA-II material if it consists of material</p> <p>(a) that is less than 225 L of water with a tritium concentration that has an activity level not greater than 0.8 TBq/L; or</p> <p>(b) in which the activity is distributed throughout and for which the estimated average specific activity does not exceed <math>10^{-4} A_2/g</math> for solids and gases and <math>10^{-5} A_2/g</math> for liquids.</p>	
<p>(3) LSA material is classified as LSA-III material if it consists of solid material that is not in powder form and that meets the applicable requirements of the <b>IAEA Regulations</b>.</p>	<p>Paragraph 409(c). <i>LSA material</i> shall be in one of three groups: [...]</p> <p>(c) <i>LSA-III</i>:</p> <p>Solids (e.g. consolidated wastes, activated materials), excluding powders, in which:</p> <p>(i) The <i>radioactive material</i> 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).</p> <p>(ii) The estimated average <i>specific activity</i> of the solid, excluding any shielding material, does not exceed <math>2 \times 10^{-3} A_2/g</math>.</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
<b>LICENCE</b>	
6. (1) A person may transport a nuclear substance without a licence issued under subsection 24(2) of the <b>Act</b> for that purpose, except in the following cases:	<p><a href="#"><u>Nuclear Safety and Control Act</u></a></p> <p>24(2) The Commission may issue, renew, suspend in whole or in part, amend, revoke or replace a licence, or authorize its transfer, on receipt of an application</p> <p>(a) in the prescribed form;</p> <p>(b) containing the prescribed information and undertakings and accompanied by the prescribed documents; and</p> <p>(c) accompanied by the prescribed fee.</p>
(a) the nuclear substance is a Category I, II or III nuclear material, as defined in section 1 of the <b>Nuclear Security Regulations</b> , and is transported outside the area in which the material is required, under section 7 of those Regulations, to be processed, used or stored;	<p><a href="#"><u>Nuclear Security Regulations</u></a></p> <p>“Category I nuclear material” means a nuclear substance listed in column 1 of Schedule 1 that is in the corresponding form set out in column 2 and the corresponding quantity set out in column 3 of Schedule 1. (matière nucléaire de catégorie I)</p> <p>“Category II nuclear material” means a nuclear substance listed in column 1 of Schedule 1 that is in the corresponding form set out in column 2 and the corresponding quantity set out in column 4 of Schedule 1. (matière nucléaire de catégorie II)</p> <p>“Category III nuclear material” means a nuclear substance listed in column 1 of Schedule 1 that is in the corresponding form set out in column 2 and the corresponding quantity set out in column 5 of Schedule 1. (matière nucléaire de catégorie III)</p>
(b) the nuclear substance is in transit in a package of a certified design or in a package that has been approved as Type B(U)-96, Type C-96 or Type H(U)-96 by a foreign competent authority in accordance with the <b>IAEA Regulations</b> unless, in the case of transport by aircraft or ship, there is no scheduled stop in Canada;	This is a general reference to conducting competent authority approvals in accordance with the IAEA Regulations.
(c) the nuclear substance is contained in a large object;	
(d) the transport of the nuclear substance cannot meet the requirements of these Regulations;	
(e) the transport of the nuclear substance requires a special use vessel; or	
(f) the transport of the nuclear substance requires multilateral approval of shipments in accordance with the <b>IAEA Regulations</b> .	<p>Paragraph 825. <i>Multilateral approval</i> shall be required for:</p> <p>(a) The <i>shipment of Type B(M) packages</i> not conforming with the requirements of para. 639 or designed to allow controlled intermittent venting.</p> <p>(b) The <i>shipment of Type B(M) packages containing radioactive material</i> with an activity greater than 3000A<sub>1</sub> or 3000A<sub>2</sub>, as appropriate, or 1000 TBq, whichever is the lower.</p> <p>(c) The <i>shipment of packages containing fissile material</i> if the sum of the CSIs of the <i>packages</i> in a single <i>freight container</i> or in a single</p>



<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	<p>conveyance exceeds 50. Excluded from this requirement shall be shipments by sea-going vessels, if the sum of the CSIs does not exceed 50 for any hold, compartment or defined deck area and the distance of 6 m between groups of packages or overpacks, as required in Table 11, is met.</p> <p>(d) Radiation protection programmes for shipments by special use vessels in accordance with para. 576(a).</p> <p>(e) The shipment of SCO-III.</p>
<p>(2) A person may possess, transfer, import, export or use prescribed equipment without a licence issued under subsection 24(2) of the <b>Act</b> for that purpose.</p> <p>(3) A person may package a nuclear substance without a licence issued under subsection 24(2) of the <b>Act</b> for that purpose.</p>	<p><a href="#"><u>Nuclear Safety and Control Act</u></a></p> <p>24(2) The Commission may issue, renew, suspend in whole or in part, amend, revoke or replace a licence, or authorize its transfer, on receipt of an application</p> <p>(a) in the prescribed form;</p> <p>(b) containing the prescribed information and undertakings and accompanied by the prescribed documents; and</p> <p>(c) accompanied by the prescribed fee.</p>
<p>(4) For greater certainty, the exemptions established in subsections (1) to (3) relate only to the packaging and transport of nuclear substances and do not otherwise derogate from the prohibitions imposed by section 26 of the <b>Act</b>.</p>	<p><a href="#"><u>Nuclear Safety and Control Act</u></a></p> <p>26. Subject to the regulations, no person shall, except in accordance with a licence,</p> <p>(a) possess, transfer, import, export, use or abandon a nuclear substance, prescribed equipment or prescribed information;</p> <p>(b) mine, produce, refine, convert, enrich, process, reprocess, package, transport, manage, store or dispose of a nuclear substance;</p> <p>(c) produce or service prescribed equipment;</p> <p>(d) operate a dosimetry service for the purposes of this Act;</p> <p>(e) prepare a site for, construct, operate, modify, decommission or abandon a nuclear facility; or</p> <p>(f) construct, operate, decommission or abandon a nuclear-powered vehicle or bring a nuclear-powered vehicle into Canada.</p>
<p>7. An application for a licence under subsection 24(2) of the <b>Act</b> to transport a nuclear substance must contain</p>	<p><a href="#"><u>Nuclear Safety and Control Act</u></a></p> <p>24(2) The Commission may issue, renew, suspend in whole or in part, amend, revoke or replace a licence, or authorize its transfer, on receipt of an application</p> <p>(a) in the prescribed form;</p> <p>(b) containing the prescribed information and undertakings and accompanied by the prescribed documents; and</p> <p>(c) accompanied by the prescribed fee.</p>
<p>(a) the applicable information required by section 3 of the <b>General Nuclear Safety and Control Regulations</b>;</p>	<p><a href="#"><u>General Nuclear Safety and Control Regulations</u></a></p> <p>GENERAL APPLICATION REQUIREMENTS</p> <p>3. (1) An application for a licence shall contain the following information:</p> <p>(a) the applicant's name and business address;</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	<p>(b) the activity to be licensed and its purpose;</p> <p>(c) the name, maximum quantity and form of any nuclear substance to be encompassed by the licence;</p> <p>(d) a description of any nuclear facility, prescribed equipment or prescribed information to be encompassed by the licence;</p> <p>(e) the proposed measures to ensure compliance with the <a href="#">Radiation Protection Regulations</a>, the <a href="#">Nuclear Security Regulations</a> and the <a href="#">Packaging and Transport of Nuclear Substances Regulations, 2015</a>;</p> <p>(f) any proposed action level for the purpose of section 6 of the <a href="#">Radiation Protection Regulations</a>;</p> <p>(g) the proposed measures to control access to the site of the activity to be licensed and the nuclear substance, prescribed equipment or prescribed information;</p> <p>(h) the proposed measures to prevent loss or illegal use, possession or removal of the nuclear substance, prescribed equipment or prescribed information;</p> <p>(i) a description and the results of any test, analysis or calculation performed to substantiate the information included in the application;</p> <p>(j) the name, quantity, form, origin and volume of any radioactive waste or hazardous waste that may result from the activity to be licensed, including waste that may be stored, managed, processed or disposed of at the site of the activity to be licensed, and the proposed method for managing and disposing of that waste;</p> <p>(k) the applicant's organizational management structure insofar as it may bear on the applicant's compliance with the <a href="#">Act</a> and the regulations made under the Act, including the internal allocation of functions, responsibilities and authority;</p> <p>(l) a description of any proposed financial guarantee relating to the activity to be licensed; and</p> <p>(m) any other information required by the Act or the regulations made under the Act for the activity to be licensed and the nuclear substance, nuclear facility, prescribed equipment or prescribed information to be encompassed by the licence.</p> <p>(1.1) The Commission or a designated officer authorized under paragraph 37(2)(c) of the Act, may require any other information that is necessary to enable the Commission or the designated officer to determine whether the applicant</p> <p>(a) is qualified to carry on the activity to be licensed; or</p> <p>(b) will, in carrying on that activity, make adequate provision for the protection of the environment, the health and safety of persons and the maintenance of national security and measures required to implement international obligations to which Canada has agreed.</p> <p>(2) Subsection (1) does not apply in respect of an application for a licence to import or export for which the information requirements are prescribed by the <a href="#">Nuclear Non-proliferation Import and Export Control Regulations</a>,</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	or in respect of an application for a licence to transport while in transit for which the information requirements are prescribed by the <a href="#">Packaging and Transport of Nuclear Substances Regulations, 2015</a> .
(b) the information required by section 5 of the <b>Nuclear Security Regulations</b> if the substance is a Category I, II or III nuclear material, as defined in those Regulations;	<a href="#">Nuclear Security Regulations</a> Licence to Transport Category I, II or III Nuclear Material 5. An application for a licence to transport Category I, II or III nuclear material shall contain, in addition to any other information required by section 7 of the Packaging and Transport of Nuclear Substances Regulations, 2015, a written transportation security plan that includes <ul style="list-style-type: none"> <li>(a) the name, quantity, radiation level in Gy/h, chemical and physical characteristics and isotopic composition of the nuclear material;</li> <li>(b) a threat assessment consisting of an evaluation of the nature, likelihood and consequences of acts or events that may place prescribed information or nuclear material at risk;</li> <li>(c) a description of the conveyance;</li> <li>(d) the proposed security measures;</li> <li>(e) the communication arrangements made among the licensee, the operator of the land vehicle transporting the nuclear material, the recipient of the material and any off-site response force along the route;</li> <li>(f) the arrangements made between the licensee and any off-site response force along the route;</li> <li>(g) the planned route; and</li> <li>(h) the alternate route to be used in case of an emergency.</li> </ul>
(c) the name, postal address and telephone number of each consignor and consignee;	
(d) if the nuclear substance is one of those referred to in paragraph 6(1)(b), <ul style="list-style-type: none"> <li>(i) a description of the nuclear substance, including the name, chemical form and physical state, the activity — or, in the case of fissile material, the mass — of each nuclear substance in a package and the total activity or mass in the consignment,</li> <li>(ii) the country of origin of the nuclear substance,</li> <li>(iii) the reason for selecting a route through Canada,</li> <li>(iv) the name of each carrier,</li> <li>(v) the dates, times and locations of its arrival into and departure from Canada and of any scheduled stop or transshipment in Canada,</li> <li>(vi) the number of the certificate or approval applicable to the package,</li> <li>(vii) the number of packages to be transported,</li> </ul>	<a href="#">Transportation of Dangerous Goods Act, 1992</a> EMERGENCY RESPONSE ASSISTANCE PLAN 7. (1) No person shall import, offer for transport, handle or transport dangerous goods in a quantity or concentration that is specified by regulation — or that is within a range of quantities or concentrations that is specified by regulation — unless the person has an emergency response assistance plan that is approved under this section before <ul style="list-style-type: none"> <li>(a) importing the dangerous goods;</li> <li>(b) offering the dangerous goods for transport; or</li> <li>(c) handling or transporting the dangerous goods, in the case where no other person is required to have an emergency response assistance plan under paragraph (a) or (b) in respect of that handling or transporting.</li> </ul> <b>Contents</b> (2) The plan shall outline what is to be done to respond to an actual or anticipated release of the dangerous goods in the course of their handling or transporting that endangers, or could endanger, public safety.

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
<p>(viii) the types of conveyance to be used during transit,</p> <p>(ix) if a vessel is to be used as a conveyance during transit, the name of the vessel and its flag state,</p> <p>(x) the United Nations number for the nuclear substance, and</p> <p>(xi) the reference number of the emergency response assistance plan that is approved under section 7 of the <b>Transportation of Dangerous Goods Act, 1992</b> or a reference to the effect that a plan is not required, as the case may be;</p>	<p><u>Approval</u></p> <p>(3) The Minister may approve the plan for a specified period, if the Minister believes on reasonable grounds that it can be implemented and will be effective in responding to such a release.</p> <p><u>Interim approval</u></p> <p>(4) The Minister may grant an interim approval of the plan for a specified period before finishing the investigation of the matters to be considered under subsection (3) if the Minister has no reason to suspect that the plan cannot be implemented or will be ineffective in responding to such a release.</p> <p><u>Revocation of approval</u></p> <p>(5) The Minister may revoke an approval of an emergency response assistance plan if</p> <p>(a) in the case of an interim approval, the Minister subsequently believes on reasonable grounds that the plan cannot be implemented or will be ineffective in responding to such a release;</p> <p>(b) the Minister believes on reasonable grounds that the plan can no longer be implemented or will no longer be effective in responding to such a release;</p> <p>(c) the Minister has requested changes to the plan that the Minister believes on reasonable grounds are needed to make it effective in responding to such a release and the changes have not been made within a reasonable time or have been refused;</p> <p>(d) the Minister believes on reasonable grounds that there has been a release of dangerous goods to which the plan applies — or that such a release has been anticipated — and that the plan was not used to respond to the actual or anticipated release; or</p> <p>(e) a direction made in respect of the plan under paragraph 7.1(a) has not been complied with.</p>
<p>(e) if the nuclear substance is contained in a large object,</p> <p>(i) information that demonstrates that the internal contamination</p> <p>(A) is contained within the object and that all openings are sealed,</p> <p>(B) meets the requirements applicable to an SCO-I or SCO-II as set out in the <b>IAEA Regulations</b>,</p> <p>(C) is caused by a substance that is classified as non-fissile or fissile-excepted radioactive material, and</p> <p>(D) is caused by a substance that is in solid form and that any liquid content is negligible,</p>	<p>PTNSR 2015:</p> <p>“large object” means an object that has been decommissioned from a nuclear facility, that is internally contaminated with nuclear substances meeting the requirements applicable to an SCO-I or SCO-II as set out in the <b>IAEA Regulations</b> and that cannot be transported in a type of package described in these Regulations due to its dimensions.</p> <p>Paragraph 413. SCO shall be in one of three groups:</p> <p>(a) SCO-I: A solid object on which:</p> <p>(i) The <i>non-fixed contamination</i> on the accessible 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 4 Bq/cm<sup>2</sup> for beta and gamma emitters and <i>low toxicity alpha emitters</i>, or 0.4 Bq/cm<sup>2</sup> for all other alpha emitters;</p> <p>(ii) The <i>fixed contamination</i> on the accessible surface averaged over 300 cm<sup>2</sup> (or the area of the surface if less than 300 cm<sup>2</sup>) does not</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	<p>exceed <math>4 \times 10^4</math> Bq/cm<sup>2</sup> for beta and gamma emitters and <i>low toxicity alpha emitters</i>, or 4000 Bq/cm<sup>2</sup> for all other alpha emitters;</p> <p>(iii) The <i>non-fixed contamination</i> plus the <i>fixed contamination</i> 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 <math>4 \times 10^4</math> Bq/cm<sup>2</sup> for beta and gamma emitters and <i>low toxicity alpha emitters</i>, or 4000 Bq/cm<sup>2</sup> for all other alpha emitters.</p> <p>(b) <i>SCO-II</i>: A solid object on which either the <i>fixed</i> or <i>non-fixed contamination</i> on the surface exceeds the applicable limits specified for <i>SCO-I</i> in (a) above and on which:</p> <p>(i) The <i>non-fixed contamination</i> on the accessible 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 400 Bq/cm<sup>2</sup> for beta and gamma emitters and <i>low toxicity alpha emitters</i>, or 40 Bq/cm<sup>2</sup> for all other alpha emitters;</p> <p>(ii) The <i>fixed contamination</i> on the accessible 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 <math>8 \times 10^5</math> Bq/cm<sup>2</sup> for beta and gamma emitters and <i>low toxicity alpha emitters</i>, or <math>8 \times 10^4</math> Bq/cm<sup>2</sup> for all other alpha emitters;</p> <p>(iii) The <i>non-fixed contamination</i> plus the <i>fixed contamination</i> 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 <math>8 \times 10^5</math> Bq/cm<sup>2</sup> for beta and gamma emitters and <i>low toxicity alpha emitters</i>, or <math>8 \times 10^4</math> Bq/cm<sup>2</sup> for all other alpha emitters.</p> <p>(C) <i>SCO-III</i>: A large solid object which, because of its size, cannot be transported in a type of <i>package</i> described in these Regulations and for which:</p> <p>(i) All openings are sealed to prevent release of <i>radioactive material</i> during conditions defined in para. 520(e);</p> <p>(ii) The inside of the object is as dry as practicable;</p> <p>(iii) The <i>non-fixed contamination</i> on the external surfaces does not exceed the limits specified in para. 508;</p> <p>(iv) The <i>non-fixed contamination</i> plus the <i>fixed contamination</i> on the inaccessible surface averaged over 300 cm<sup>2</sup> does not exceed <math>8 \times 10^5</math> Bq/cm<sup>2</sup> for beta and gamma emitters and <i>low toxicity alpha emitters</i>, or <math>8 \times 10^4</math> Bq/cm<sup>2</sup> for all other alpha emitters.</p>
<p>(ii) information that demonstrates that the large object</p> <p>(A) meets the free drop test requirements set out in the <b>IAEA Regulations</b> for the industrial package type referred to in section 27 for the SCO classification determined for the internal contamination,</p>	<p>Paragraph 722*. Free drop test: The specimen shall drop onto the target so as to suffer maximum damage in respect of the safety features to be tested:</p> <p>(a) The height of the drop, measured from the lowest point of the specimen to the upper surface of the target, shall be not less than the distance specified in Table 14 for the applicable mass. The target shall be as defined in para. 717.</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
<p>(B) does not have a dose rate on contact of more than 2 mSv/h from the accessible surfaces of the object, as prepared for shipment, and</p> <p>(C) does not have more than 4 Bq/cm<sup>2</sup> of contamination on the exterior surfaces,</p>	<p>(b) For rectangular fibreboard or wood <i>packages</i> not exceeding a mass of 50 kg, a separate specimen shall be subjected to a free drop onto each corner from a height of 0.3 m.</p> <p>(c) For cylindrical fibreboard <i>packages</i> not exceeding a mass of 100 kg, a separate specimen shall be subjected to a free drop onto each of the quarters of each rim from a height of 0.3 m.</p> <p>*Note that the criteria to be used for the drop test are found in paragraph 648 of the IAEA Regulations:</p> <p>Paragraph 648. A <i>package</i> shall be so designed that if it were subjected to the tests specified in paras 719–724, it would prevent:</p> <p>(a) Loss or dispersal of the <i>radioactive contents</i>;</p> <p>(b) More than a 20% increase in the maximum <i>dose rate</i> at any external surface of the <i>package</i>.</p>
<p>(iii) a detailed transport plan covering all activities associated with the shipment, including</p> <p>(A) radiation protection,</p> <p>(B) emergency response, and</p> <p>(C) any special precautions or special administrative or operational controls that are to be employed during transport, and</p> <p>(iv) details of the applicable management system;</p>	
<p>(f) if the transport of the nuclear substance cannot meet the requirements of these Regulations,</p> <p>(i) information that demonstrates that the overall level of safety in transport is at least equivalent to that which would be provided if all the applicable requirements of these Regulations were met,</p> <p>(ii) a statement of the reasons why the consignment cannot meet the requirements of these Regulations, and</p> <p>(iii) a statement of any special precautions or special administrative or operational controls that are to be employed during transport to compensate for the inability to meet the requirements of these Regulations;</p>	
<p>(g) if the transport of the nuclear substance requires a special use vessel,</p> <p>(i) the vessel owner's and operator's contact information, including, as applicable, their names, postal addresses, email addresses, telephone numbers and fax numbers,</p> <p>(ii) a copy of the radiation protection program applicable to the shipment,</p> <p>(iii) details of the consignment,</p>	

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
<p>(iv) information on the stowage arrangements for the duration of the voyage, including for any consignments loaded or unloaded at ports of call en route,</p> <p>(v) the dates, times and locations of arrival into and departure from Canada and of any scheduled stop in Canada,</p> <p>(vi) a copy of any certificate or approval applicable to packages or materials in the consignment,</p> <p>(vii) the name of the vessel and its flag state, and</p> <p>(viii) a copy of any document issued by the competent authority of the vessel's flag state approving the radiation protection program; and</p>	
<p>(h) if the transport of the nuclear substance requires approval of shipment in accordance with the <b>IAEA Regulations</b>,</p> <p>(i) the period of time, related to the shipment, for which the approval is sought,</p> <p>(ii) information on the radioactive contents, the expected types of conveyance and the probable or proposed route,</p> <p>(iii) details of how the precautions and administrative or operational controls referred to in the approval for the package design, if applicable, that was issued in accordance with the <b>IAEA Regulations</b> are to be put into effect,</p> <p>(iv) a copy of the applicable approvals for the package design, and</p> <p>(v) in the case of fissile material, information on the sum of criticality safety indexes and any related safety assessment, emergency response plan and administrative or operational controls.</p>	<p>APPROVAL OF SHIPMENTS</p> <p>Paragraph 825. <i>Multilateral approval</i> shall be required for:</p> <p>(a) The <i>shipment</i> of <i>Type B(M)</i> packages not conforming with the requirements of para. 639 or designed to allow controlled intermittent venting.</p> <p>(b) The <i>shipment</i> of <i>Type B(M)</i> packages containing <i>radioactive material</i> with an activity greater than 3000A<sub>1</sub> or 3000A<sub>2</sub>, as appropriate, or 1000 TBq, whichever is the lower.</p> <p>(c) The <i>shipment</i> of <i>packages</i> containing <i>fissile material</i> if the sum of the CSIs of the <i>packages</i> in a single <i>freight container</i> or in a single <i>conveyance</i> exceeds 50. Excluded from this requirement shall be <i>shipments</i> by sea-going <i>vessels</i> if the sum of the CSIs does not exceed 50 for any hold, compartment or <i>defined deck area</i> and the distance of 6 m between groups of <i>packages</i> or <i>overpacks</i>, as required in Table 11, is met.</p> <p>(d) <i>Radiation protection programmes</i> for <i>shipments</i> by special use <i>vessels</i> in accordance with para. 576(a).</p> <p>(e) The <i>shipment</i> of <i>SCO-III</i>.</p> <p>Paragraph 826. A <i>competent authority</i> may authorize transport <i>through</i> or <i>into</i> its country without <i>shipment approval</i>, by a specific provision in its <i>design approval</i>.</p> <p>Paragraph 827. An application for <i>approval of shipment</i> shall include:</p> <p>(a) The period of time, related to the <i>shipment</i>, for which the <i>approval</i> is sought;</p> <p>(b) The actual <i>radioactive contents</i>, the expected modes of transport, the type of <i>conveyance</i> and the probable or proposed route;</p> <p>(c) The details of how the precautions and administrative or operational controls, referred to in the certificates of <i>approval</i> for the <i>package design</i>, if applicable, issued under paras 810, 813 and 816, are to be put into effect.</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	<p>Paragraph 827A. An application for or approval of <i>SCO-III shipments</i> shall include:</p> <ul style="list-style-type: none"> <li>(a) A statement of the respects in which, and of the reasons why, the <i>consignment</i> is considered <i>SCO-III</i>;</li> <li>(b) Justification for choosing <i>SCO-III</i> by demonstrating that: <ul style="list-style-type: none"> <li>(i) No suitable <i>packaging</i> currently exists;</li> <li>(ii) Designing and/or constructing a <i>packaging</i> or segmenting the object is not practically, technically or economically feasible;</li> <li>(iii) No other viable alternative exists.</li> </ul> </li> <li>(c) A detailed description of the proposed <i>radioactive contents</i> with reference to their physical and chemical states and the nature of the radiation emitted.</li> <li>(d) A detailed statement of the <i>design</i> of the <i>SCO-III</i>, including complete engineering drawings and schedules of materials and methods of manufacture.</li> <li>(e) All information necessary to satisfy the <i>competent authority</i> that the requirements of para. 520(e) and the requirements of para. 522, if applicable, are satisfied.</li> <li>(f) A transport plan.</li> <li>(g) A specification of the applicable <i>management system</i> as required in para. 306.</li> </ul>
<b>PACKAGING REQUIREMENTS</b>	
<p>8. Type H(M) packages must meet the following requirements:</p> <ul style="list-style-type: none"> <li>(a) they must be designed and maintained to meet national or international standards other than the International Organization for Standardization standard ISO 7195 entitled <i>Nuclear Energy — Packaging of uranium hexafluoride (UF<sub>6</sub>) for transport</i>, as amended from time to time, provided that an equivalent level of safety is maintained;</li> <li>(b) they must withstand, without leakage and without unacceptable stress, a hydraulic test at an internal pressure of at least 1.38 MPa;</li> <li>(c) they must withstand, without loss or dispersal of uranium hexafluoride, the free drop test set out in the <b>IAEA Regulations</b> for normal conditions of transport;</li> </ul>	<p>ISO 7195 Nuclear Energy — Packaging of uranium hexafluoride (UF<sub>6</sub>) for transport [4]</p> <p>Paragraph 722*. Free drop test: The specimen shall drop onto the target so as to suffer maximum damage in respect of the safety features to be tested:</p> <ul style="list-style-type: none"> <li>(a) The height of the drop, measured from the lowest point of the specimen to the upper surface of the target, shall be not less than the distance specified in Table 14 for the applicable mass. The target shall be as defined in para. 717.</li> <li>(b) For rectangular fibreboard or wood <i>packages</i> not exceeding a mass of 50 kg, a separate specimen shall be subjected to a free drop onto each corner from a height of 0.3 m.</li> <li>(c) For cylindrical fibreboard <i>packages</i> not exceeding a mass of 100 kg, a separate specimen shall be subjected to a free drop onto each of the quarters of each rim from a height of 0.3 m.</li> </ul> <p>*Note that the criteria to be used for the drop test are found in paragraph 648 of the IAEA Regulations.</p> <p>Paragraph 648. A <i>package</i> shall be so designed that if it were subjected to the tests specified in paras 719–724, it would prevent:</p> <ul style="list-style-type: none"> <li>(a) Loss or dispersal of the <i>radioactive contents</i>;</li> <li>(b) More than a 20% increase in the maximum <i>dose rate</i> at any external surface of the <i>package</i>;</li> </ul>



<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
<p>(d) they must withstand, without rupture of the containment system, the thermal test set out in the <b>IAEA Regulations</b> for accident conditions of transport, unless they are designed to contain 9,000 kg or more of uranium hexafluoride; and</p> <p>(e) they must not be equipped with pressure relief devices.</p>	<p>Paragraph 728. Thermal test: The specimen shall be in thermal equilibrium under conditions of an ambient temperature of 38°C, subject to the solar insolation conditions specified in Table 12 and subject to the <i>design</i> maximum rate of internal heat generation within the <i>package</i> from the <i>radioactive contents</i>. Alternatively, any of these parameters are allowed to have different values prior to, and during, the test, provided due account is taken of them in the subsequent assessment of <i>package</i> response. The thermal test shall then consist of (a) followed by (b).</p> <p>(a) Exposure of a specimen for a period of 30 min to a thermal environment that provides a heat flux at least equivalent to that of a hydrocarbon fuel–air fire in sufficiently quiescent ambient conditions to give a minimum average flame emissivity coefficient of 0.9 and an average temperature of at least 800°C, fully engulfing the specimen, with a surface absorptivity coefficient of 0.8 or that value that the <i>package</i> may be demonstrated to possess if exposed to the fire specified.</p> <p>(b) Exposure of the specimen to an ambient temperature of 38°C, subject to the solar insolation conditions specified in Table 12 and subject to the <i>design</i> maximum rate of internal heat generation within the <i>package</i> by the <i>radioactive contents</i> for a sufficient period to ensure that temperatures in the specimen are decreasing in all parts of the specimen and/or are approaching initial steady state conditions. Alternatively, any of these parameters are allowed to have different values following cessation of heating, provided due account is taken of them in the subsequent assessment of <i>package</i> response. During and following the test, the specimen shall not be artificially cooled and any combustion of materials of the specimen shall be permitted to proceed naturally.</p>
<p>9. Type H(U) packages must meet the following requirements:</p> <p>(a) they must be designed and maintained to meet the International Organization for Standardization standard ISO 7195 entitled <i>Nuclear Energy - Packaging of uranium hexafluoride (UF<sub>6</sub>) for transport</i>, as amended from time to time;</p>	<p>ISO 7195 <i>Nuclear Energy — Packaging of uranium hexafluoride (UF<sub>6</sub>) for transport</i> [4]</p>
<p>(b) they must withstand, without leakage and without unacceptable stress, as specified in standard ISO 7195, as amended from time to time, the hydraulic test set out in the <b>IAEA Regulations</b>;</p>	<p>Paragraph 718. Specimens that comprise or simulate <i>packagings</i> designed to contain 0.1 kg or more of uranium hexafluoride shall be tested hydraulically at an internal pressure of at least 1.38 MPa, but when the test pressure is less than 2.76 MPa, the <i>design</i> shall require <i>multilateral approval</i>. For retesting <i>packagings</i>, any other equivalent non-destructive testing may be applied, subject to <i>multilateral approval</i>.</p>
<p>(c) they must withstand, without loss or dispersal of uranium hexafluoride, the free drop test set out in the <b>IAEA Regulations</b> for normal conditions of transport;</p>	<p>Paragraph 722*. Free drop test: The specimen shall drop onto the target so as to suffer maximum damage in respect of the safety features to be tested:</p> <p>(a) The height of the drop, measured from the lowest point of the specimen to the upper surface of the target, shall be not less than the</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	<p>distance specified in Table 14 for the applicable mass. The target shall be as defined in para. 717.</p> <p>(b) For rectangular fibreboard or wood <i>packages</i> not exceeding a mass of 50 kg, a separate specimen shall be subjected to a free drop onto each corner from a height of 0.3 m.</p> <p>(c) For cylindrical fibreboard <i>packages</i> not exceeding a mass of 100 kg, a separate specimen shall be subjected to a free drop onto each of the quarters of each rim from a height of 0.3 m.</p> <p>*Note that the criteria to be used for the drop test are found in paragraph 648 of the IAEA Regulations:</p> <p>Paragraph 648. A <i>package</i> shall be so designed that if it were subjected to the tests specified in paras 719–724, it would prevent:</p> <p>(a) Loss or dispersal of the <i>radioactive contents</i>;</p> <p>(b) More than a 20% increase in the maximum <i>dose rate</i> at any external surface of the <i>package</i>.</p>
<p>(d) they must withstand, without rupture of the containment system, the thermal test set out in the <b>IAEA Regulations</b> for accident conditions of transport; and</p> <p>(e) they must not be equipped with pressure relief devices.</p>	<p>728. Thermal test: The specimen shall be in thermal equilibrium under conditions of an ambient temperature of 38°C, subject to the solar insolation conditions specified in Table 12 and subject to the <i>design</i> maximum rate of internal heat generation within the <i>package</i> from the <i>radioactive contents</i>. Alternatively, any of these parameters are allowed to have different values prior to, and during, the test, provided due account is taken of them in the subsequent assessment of <i>package</i> response. The thermal test shall then consist of (a) followed by (b).</p> <p>(a) Exposure of a specimen for a period of 30 min to a thermal environment that provides a heat flux at least equivalent to that of a hydrocarbon fuel–air fire in sufficiently quiescent ambient conditions to give a minimum average flame emissivity coefficient of 0.9 and an average temperature of at least 800°C, fully engulfing the specimen, with a surface absorptivity coefficient of 0.8 or that value that the <i>package</i> may be demonstrated to possess if exposed to the fire specified.</p> <p>(b) Exposure of the specimen to an ambient temperature of 38°C, subject to the solar insolation conditions specified in Table 12 and subject to the <i>design</i> maximum rate of internal heat generation within the <i>package</i> by the <i>radioactive contents</i> for a sufficient period to ensure that temperatures in the specimen are decreasing in all parts of the specimen and/or are approaching initial steady state conditions. Alternatively, any of these parameters are allowed to have different values following cessation of heating, provided due account is taken of them in the subsequent assessment of <i>package</i> response. During and following the test, the specimen shall not be artificially cooled and any combustion of materials of the specimen shall be permitted to proceed naturally.</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
<b>CERTIFICATION</b>	
<p>10. (1) The design of the following types of prescribed equipment must be certified by the Commission or a designated officer before the design is used:</p> <ul style="list-style-type: none"> <li>(a) Type B and Type C packages;</li> <li>(b) packages used to transport fissile material;</li> <li>(c) packages used to transport 0.1 kg or more of uranium hexafluoride;</li> <li>(d) special form radioactive material; and</li> <li>(e) low dispersible radioactive material.</li> </ul>	
<p>(2) The design of the following types of prescribed equipment may be used without being certified if, before the design is used, it is approved by a foreign competent authority in accordance with the <b>IAEA Regulations</b>:</p> <ul style="list-style-type: none"> <li>(a) special form radioactive material, if it is being transported;</li> <li>(b) a Type B(U)-96 or Type C-96 package, if it is in transit; and</li> <li>(c) a Type H(U)-96 package, if it contains 0.1 kg or more of uranium hexafluoride.</li> </ul>	This is a general reference to conducting competent authority approvals in accordance with the IAEA Regulations.
<p>(3) The calculation of a value demonstrating that fissile-excepted radioactive material will remain subcritical must be certified by the Commission or a designated officer before the value is used, except in relation to the following materials:</p> <ul style="list-style-type: none"> <li>(a) uranium enriched in uranium-235 to a maximum of 1% by mass and with a plutonium and uranium-233 content not exceeding 1% of the mass of uranium-235, provided that the fissile nuclides are distributed essentially homogeneously throughout the material and any uranium-235 that is present in metallic, oxide or carbide forms must not form a lattice arrangement;</li> <li>(b) liquid solutions of uranyl nitrate enriched in uranium-235 to a maximum of 2% by mass, with a plutonium and uranium-233 content not exceeding 0.002% of the mass of uranium, and with a minimum nitrogen to uranium (N/U) atomic ratio of 2;</li> <li>(c) uranium with a maximum uranium enrichment of 5% by mass of uranium-235 provided that <ul style="list-style-type: none"> <li>(i) there is no more than 3.5 g of uranium-235 per package,</li> </ul> </li> </ul>	

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
<p>(ii) the plutonium and uranium-233 content does not exceed 1% of the mass of uranium-235 per package, and</p> <p>(iii) the amount of fissile nuclides in the consignment is limited to 45g;</p> <p>(d) fissile nuclides with a total mass not greater than 2.0 g per package, provided that the total mass of fissile nuclides in the consignment is limited to 15 g; and</p> <p>(e) fissile nuclides with a total mass not greater than 45 g per consignment, either packaged or unpackaged, provided that it is transported under exclusive use.</p>	
<p>(4) The following calculations must be certified by the Commission or a designated officer before the value is used:</p> <p>(a) the calculation of the basic radionuclide value for radioactive material that has a basic radionuclide value that is not listed in the <b>IAEA Regulations</b>; and</p> <p>(b) the calculation of the alternative activity limit for an instrument or article that has an alternative activity limit for an exempt consignment.</p>	<p>DETERMINATION OF BASIC RADIONUCLIDE VALUES</p> <p>Paragraph 403. For individual radionuclides:</p> <p>(a) That are not listed in Table 2, the determination of the basic radionuclide values referred to in para. 402 shall require <i>multilateral approval</i>. For these radionuclides, activity concentrations for exempt material and activity limits for exempt <i>consignments</i> shall be calculated in accordance with the principles established in the GSR Part 3 [7]. It is permissible to use an <math>A_2</math> value calculated using a dose coefficient for the appropriate lung absorption type, as recommended by the International Commission on Radiological Protection, if the chemical forms of each radionuclide under both normal and accident conditions of transport are taken into consideration. Alternatively, the radionuclide values in Table 3 may be used without obtaining <i>competent authority approval</i>.</p> <p>(b) In instruments or articles in which the <i>radioactive material</i> is enclosed in or is included as a component part of the instrument or other manufactured article and which meets para. 423(c), alternative basic radionuclide values to those in Table 2 for the activity limit for an exempt <i>consignment</i> are permitted and shall require <i>multilateral approval</i>. Such alternative activity limits for an exempt <i>consignment</i> shall be calculated in accordance with the principles set out in the GSR Part 3 [7].</p>
<p>11. (1) An application for certification of a design for the types of prescribed equipment referred to in subsection 10(1) must include the information required for the applicable approval under the <b>IAEA Regulations</b> and</p>	<p>Paragraph 803. The <i>design</i> for <i>special form radioactive material</i> shall require <i>unilateral approval</i>. The <i>design</i> for <i>low dispersible radioactive material</i> shall require <i>multilateral approval</i>. In both cases, an application for <i>approval</i> shall include:</p> <p>(a) A detailed description of the <i>radioactive material</i> or, if a capsule, the contents; particular reference shall be made to both physical and chemical states.</p> <p>(b) A detailed statement of the <i>design</i> of any capsule to be used.</p> <p>(c) A statement of the tests that have been carried out and their results, or evidence based on calculations, to show that the radioactive material is capable of meeting the performance standards, or other evidence that</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	<p>the <i>special form radioactive material</i> or <i>low dispersible radioactive material</i> meets the applicable requirements of these Regulations.</p> <p>(d) A specification of the applicable <i>management system</i>, as required in para. 306.</p> <p>(e) Any proposed pre-shipment actions for use in the <i>consignment of special form radioactive material</i> or <i>low dispersible radioactive material</i>.</p> <p>Paragraph 807. The <i>approval of designs</i> for <i>packages</i> containing 0.1 kg or more of uranium hexafluoride requires that: [...]</p> <p>(c) The application for <i>approval</i> shall include all information necessary to satisfy the <i>competent authority</i> that the <i>design</i> meets the requirements of para. 631 and a specification of the applicable <i>management system</i>, as required in para. 306.</p> <p>Paragraph 809. An application for <i>approval</i> shall include:</p> <p>(a) A detailed description of the proposed <i>radioactive contents</i> with reference to their physical and chemical states and the nature of the radiation emitted.</p> <p>(b) A detailed statement of the <i>design</i>, including complete engineering drawings and schedules of materials and methods of manufacture.</p> <p>(c) A statement of the tests that have been carried out and their results, or evidence based on calculations or other evidence that the <i>design</i> is adequate to meet the applicable requirements.</p> <p>(d) The proposed operating and maintenance instructions for the use of the <i>packaging</i>.</p> <p>(e) If the <i>package</i> is designed to have a <i>maximum normal operating pressure</i> in excess of 100 kPa gauge, a specification of the materials of manufacture of the <i>containment system</i>, the samples to be taken and the tests to be made.</p> <p>(f) If the <i>package</i> is to be used for <i>shipment</i> after storage, a justification of considerations to ageing mechanisms in the safety analysis and within the proposed operating and maintenance instructions.</p> <p>(g) Where the proposed <i>radioactive contents</i> are irradiated nuclear fuel, the applicant shall state and justify any assumption in the safety analysis relating to the characteristics of the fuel and describe any pre-shipment measurement required by para. 677(b).</p> <p>(h) Any special stowage provisions necessary to ensure the safe dissipation of heat from the <i>package</i> considering the various modes of transport to be used and the type of <i>conveyance</i> or <i>freight container</i>.</p> <p>(i) A reproducible illustration, not larger than 21 cm × 30 cm, showing the make-up of the <i>package</i>.</p> <p>(j) A specification of the applicable <i>management system</i> as required in para. 306.</p> <p>(k) For <i>packages</i> which are to be used for <i>shipment</i> after storage, a gap analysis programme describing a systematic procedure for a periodic</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	<p>evaluation of changes of regulations, changes in technical knowledge and changes of the state of the <i>package design</i> during storage.</p> <p>Paragraph 812. An application for <i>approval</i> of a <i>Type B(M) package design</i> shall include, in addition to the information required in para. 809 for <i>Type B(U) packages</i>:</p> <p>(a) A list of the requirements specified in paras 639, 655–657 and 660–666 with which the <i>package</i> does not conform;</p> <p>(b) Any proposed supplementary operational controls to be applied during transport not regularly provided for in these Regulations, but which are necessary to ensure the safety of the <i>package</i> or to compensate for the deficiencies listed in (a);</p> <p>(c) A statement relative to any restrictions on the mode of transport and to any special loading, carriage, unloading or handling procedures;</p> <p>(d) A statement of the range of ambient conditions (temperature, solar insolation) that are expected to be encountered during transport and which have been taken into account in the <i>design</i>.</p> <p>Paragraph 815. An application for <i>approval</i> shall include all information necessary to satisfy the <i>competent authority</i> that the <i>design</i> meets the requirements of para. 673 and a specification of the applicable <i>management system</i>, as required in para. 306.</p>
(a) the number of any applicable approval issued by a foreign competent authority, in accordance with the <b>IAEA Regulations</b> ;	This is a general reference to conducting competent authority approvals in accordance with the IAEA Regulations.
(b) in respect of a package design, (i) the recommended inspection and servicing program, and (ii) instructions for packing, transport, receiving, maintenance and unpacking; and (c) any other information necessary to demonstrate that the design meets the requirements of these Regulations.	
(2) An applicant must give the Commission, or a designated officer, a reasonable opportunity to observe any test that the applicant intends to conduct to demonstrate the compliance of a design with these Regulations, including reasonable notice of the date and time of the test.	
(3) No later than 60 days after the day on which the certificate of a design expires, an applicant may make a new application to the Commission or a designated officer to certify the design if the technical specifications of the design have not been modified. The application must include (a) a statement confirming that the drawings and procedures previously submitted have not been	

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
<p>modified or, if they have been modified, a copy of the revised drawings and procedures and a statement confirming that the modifications are without technical significance and do not affect the safety of the design;</p> <p>(b) a statement confirming that each type of prescribed equipment referred to in subsection 10(1) has been produced and maintained in compliance with the drawings and procedures previously submitted;</p> <p>(c) a statement confirming that the instructions previously submitted in respect of the certified design have not been modified;</p> <p>(d) unless previously submitted, the model number and drawings of any capsule containing radioactive material;</p> <p>(e) a list of the serial numbers used for the certified design, other than a certified design referred to in paragraph (f);</p>	
<p>(f) in respect of a design that was certified after approval by a foreign competent authority in accordance with the <b>IAEA Regulations</b>, a list of the serial numbers currently in use or intended for use in Canada;</p> <p>(g) a list of the known users in Canada of the latest certified design;</p> <p>(h) a summary of the maintenance performed and any operational or maintenance problems encountered with the certified design, including the date, the nature of the problem and any action taken;</p> <p>(i) a copy of any applicable approval issued by the foreign competent authority in accordance with the <b>IAEA Regulations</b> since the last certification;</p> <p>(j) a copy of the documents submitted to the foreign competent authority to obtain each approval; and</p> <p>(k) any other information necessary to demonstrate that the design meets the applicable requirements of these Regulations.</p>	<p>These are general references to conducting competent authority approvals in accordance with the IAEA Regulations.</p>
<p>12. (1) An application for certification of the calculation referred to in subsection 10(3) must include</p> <p>(a) a description of the fissile-excepted radioactive material, including its name, chemical form and physical state;</p> <p>(b) the calculation of a value demonstrating that the material will remain subcritical without the need for accumulation control under the conditions described</p>	<p>Paragraph 606. <i>Fissile material</i> excepted from classification as "FISSILE" under para. 417(f) shall be subcritical without the need for accumulation control under the following conditions:</p> <p>(a) The conditions of para. 673(a);</p> <p>(b) The conditions consistent with the assessment provisions stated in paras 684(b) and 685(b) for <i>packages</i>;</p> <p>(c) The conditions specified in para. 683(a), if transported by air.</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
in the <b>IAEA Regulations</b> , including tests performed, principles used, assumptions made, scenarios considered, limitations that should be applied and any data, formulae or analysis tool used;	
(c) in respect of the calculation, a copy of any applicable approval issued by a foreign competent authority in accordance with the <b>IAEA Regulations</b> ; (d) in respect of a special form radioactive material, a copy of any applicable approval issued by a foreign competent authority in accordance with the <b>IAEA Regulations</b> or a copy of any applicable certificate; (e) in respect of low dispersible radioactive material, a copy of any applicable certificate; (f) details of the applicable management system; (g) details of any actions needed to be taken before shipment; and (h) any other information necessary to demonstrate that the calculation meets the applicable requirements of these Regulations.	These are general references to conducting competent authority approvals in accordance with the IAEA Regulations.
(2) No later than 60 days after the day on which the certificate expires, an applicant may make a new application for certification to the Commission or a designated officer if the calculation of the value has not been modified. The application must include (a) a statement confirming that the calculation of a value demonstrating that the material will remain subcritical without the need for accumulation control under the conditions described in the <b>IAEA Regulations</b> has not been modified and that the tests performed, principles used, assumptions made, scenarios considered, limitations that should be applied and any data, formulae or analysis tool used have not been modified;	APPROVAL OF MATERIAL EXCEPTED FROM FISSILE CLASSIFICATION 805. The <i>design for fissile material</i> excepted from "FISSILE" classification in accordance with Table 1, under para. 417(f) shall require <i>multilateral approval</i> . An application for <i>approval</i> shall include: (a) A detailed description of the material; particular reference shall be made to both physical and chemical states. (b) A statement of the tests that have been carried out and their results, or evidence based on calculations, to show that the material is capable of meeting the requirements specified in para. 606. (c) A specification of the applicable <i>management system</i> as required in para. 306. (d) A statement of specific actions to be taken prior to <i>shipment</i> .
(b) a copy of any applicable approval issued by the foreign competent authority in accordance with the <b>IAEA Regulations</b> since the last certification; (c) a statement confirming that the details of the applicable management system and any actions needed to be taken before shipment that were previously submitted have not been modified; and (d) any other information necessary to demonstrate that the calculation meets the applicable requirements of these Regulations.	This is a general reference to conducting competent authority approvals in accordance with the IAEA Regulations.



<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
<p>13. (1) An application for certification of the calculation referred to in subsection 10(4) must include</p> <ul style="list-style-type: none"> <li>(a) a description of the nuclear substance, including its name, chemical form and physical state;</li> <li>(b) the calculation of the basic radionuclide value, including the principles used, assumptions made, scenarios considered and any data or formulae used to determine the value;</li> <li>(c) a copy of any applicable approval issued by a foreign competent authority in accordance with the <b>IAEA Regulations</b>;</li> <li>(d) in respect of an instrument or article, <ul style="list-style-type: none"> <li>(i) details of the instrument or article that will contain the nuclear substance, including the identification, details of construction and intended uses of the instrument or article and the location of the nuclear substance,</li> <li>(ii) the maximum activity of the instrument or article,</li> <li>(iii) the maximum external radiation level arising from the instrument or article,</li> <li>(iv) details of the management system for the design and production of the instrument or article, and</li> <li>(v) instructions for the use, inspection, maintenance and disposal of the instrument or article; and</li> </ul> </li> <li>(e) any other information necessary to demonstrate that the calculation meets the applicable requirements of these Regulations.</li> </ul>	<p>This is a general reference to conducting competent authority approvals in accordance with the IAEA Regulations.</p>
<p>(2) No later than 60 days after the day on which the certificate expires, an applicant may make a new application for certification to the Commission or a designated officer if the calculation has not been modified. The application must include</p> <ul style="list-style-type: none"> <li>(a) a statement confirming that the calculation of the basic radionuclide value, including the principles used, assumptions made, scenarios considered and any data or formulae used to determine the calculation, has not been modified;</li> <li>(b) in respect of an instrument or article, a statement confirming that the information previously submitted has not been modified or, if it has been modified, the revised information and a statement confirming that the modifications are without technical significance and do not affect safety;</li> </ul>	<p>This is a general reference to conducting competent authority approvals in accordance with the IAEA Regulations.</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
<p>(c) a copy of any applicable approval issued by the foreign competent authority in accordance with the <b>IAEA Regulations</b> since the last certification;</p> <p>(d) a statement confirming that the instructions previously submitted in respect of the certified calculation have not been modified; and</p> <p>(e) any other information necessary to demonstrate that the calculation meets the applicable requirements of these Regulations.</p>	
<p>14. (1) The applications for certification referred to in sections 11 to 13 must be made to the Commission or a designated officer.</p> <p>(2) If the certified design or calculation referred to in section 10 has been modified in a manner that affects the safety of the prescribed equipment referred to in that section, the certificate is void and a new application for certification must be made.</p>	
<p>15. (1) The Commission, or the designated officer, must notify a person who has applied for certification of a proposed decision not to certify, as well as the basis for the proposed decision, at least 30 days before making the decision.</p> <p>(2) The notice must include a description of the person's right to be provided with an opportunity to be heard in accordance with section 17.</p>	
<p>16. (1) The Commission, or the designated officer, must notify a person to whom a certificate has been issued and, in the case of a certificate for a package design, any registered user of a package of that design, of a proposed decision to decertify, as well as the basis for the proposed decision, at least 30 days before making the decision.</p> <p>(2) The notice must include a description of the person's and the registered user's right to be provided with an opportunity to be heard in accordance with section 17.</p>	
<p>17. (1) The Commission, or the designated officer, must provide the person referred to in section 15 or 16 or the registered user referred to in section 16 with an opportunity, in respect of the proposed decision, to be heard either orally or in writing if, within 30 days after the date of the notice, they request that opportunity.</p> <p>(2) Every person and registered user who is notified in accordance with section 15 or 16 must be notified of the final decision and the reasons for it.</p>	

<b><i>Packaging and Transport of Nuclear Substances Regulations, 2015</i></b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
<b>PRODUCTION, USE AND POSSESSION OF PRESCRIBED EQUIPMENT</b>	
<p>18. Every person who produces a package of a certified design must</p> <p>(a) produce the package in accordance with the requirements set out in the certificate; and</p> <p>(b) clearly mark the package with the certificate number, design number and serial number.</p>	
<p>19. (1) A person who intends to use a package of a certified design must apply to the Commission to register their use of the package.</p> <p>(2) The Commission must register the applicant's intended use of the package on receipt of an application containing the following:</p> <p>(a) the applicant's contact information, including, as applicable, their name, postal address, email address, telephone number and fax number;</p> <p>(b) the name of a person who can be contacted for transport purposes;</p> <p>(c) the number of any licence that the applicant holds in respect of the contents of the package;</p> <p>(d) the number of any applicable approval issued by a foreign competent authority in accordance with the <b>IAEA Regulations</b>;</p> <p>(e) the package's design and serial numbers; and</p> <p>(f) a statement confirming that the applicant possesses the instructions necessary to prepare the package for shipment, as set out in the certificate for the package design.</p> <p>(3) An applicant may use the package only if they have received confirmation from the Commission that their use of the package has been registered.</p>	<p>This is a general reference to conducting competent authority approvals in accordance with the IAEA Regulations.</p>
<p>20. (1) Every person who produces special form radioactive material must</p> <p>(a) use a certified design and produce the material in accordance with the requirements set out in the certificate; and</p> <p>(b) clearly mark the material, or any source holder to which it is permanently attached, in a unique, legible and durable manner.</p> <p>(2) A person may transport special form radioactive material only if it has been produced in accordance with a certified design or a design approved by a foreign</p>	<p>These are general references to conducting competent authority approvals in accordance with the IAEA Regulations.</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
<p>competent authority in accordance with the <b>IAEA Regulations</b>.</p> <p>(3) Every person who possesses special form radioactive material, the design of which was approved under the 1973, 1973 (as amended), 1985 or 1985 (as amended in 1990) edition of the <b>IAEA Regulations</b>, must ensure that the material was produced before January 1, 2004 and that it is used in compliance with section 24.</p>	
<p>21. (1) Every person who produces low dispersible radioactive material must</p> <p>(a) use a certified design and produce the material in accordance with the requirements set out in the certificate; and</p> <p>(b) clearly mark the material in a unique, legible and durable manner.</p> <p>(2) A person may transport low dispersible radioactive material only if it has been produced in accordance with a certified design.</p>	
<p>22. (1) Every person who produces an instrument or article that has an alternative activity limit for an exempt consignment must use the applicable certified calculation and produce the instrument or article in accordance with the requirements set out in the certificate.</p> <p>(2) A person may transport an instrument or article that has an alternative activity limit for an exempt consignment only if it has been produced using the applicable certified calculation.</p>	
<p>23. (1) Every person who produces fissile-excepted radioactive material that requires a certified calculation of a value demonstrating that the material will remain subcritical must do so in accordance with the requirements set out in the certificate.</p> <p>(2) A person may transport fissile excepted radioactive material that requires a certified calculation of a value demonstrating that the material will remain subcritical only if it has been produced in accordance with the requirements set out in the certificate.</p>	
<b>MANAGEMENT SYSTEM</b>	
<p>24. Every person who designs, produces, tests, uses, inspects, maintains or repairs prescribed equipment must</p> <p>(a) implement and maintain a management system in accordance with the <b>IAEA Regulations</b>;</p>	<p>Paragraph 306. A <i>management system</i> based on international, national or other standards acceptable to the <i>competent authority</i> shall be established and implemented for all activities within the scope of the Regulations, as identified in para. 106, to ensure compliance with the relevant provisions of these Regulations. Certification that the <i>design</i> specification has been fully implemented shall be available to the</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
<p>(b) keep a record documenting the system and of any information collected under it; and</p> <p>(c) retain the record for a period ending two years after the day on which the prescribed equipment is removed from service.</p>	<p><i>competent authority</i>. The manufacturer, <i>consignor</i> or user shall be prepared:</p> <p>(a) To provide facilities for inspection during manufacture and use;</p> <p>(b) To demonstrate compliance with these Regulations to the <i>competent authority</i>.</p> <p>Where <i>competent authority approval</i> is required, such <i>approval</i> shall take into account, and be contingent upon, the adequacy of the <i>management system</i>.</p>
<b>PACKAGING AND TRANSPORT OF RADIOACTIVE MATERIAL</b>	
<p>25. (1) Every person who transports, or presents for transport, radioactive material must comply with the requirements of the <b><i>Transportation of Dangerous Goods Regulations</i></b>.</p>	<p><a href="#"><u><i>Transportation of Dangerous Goods Regulations</i></u></a></p>
<p>(2) Every consignor, other than a consignor of an excepted package, must comply with the requirements of the <b>IAEA Regulations</b> in respect of</p> <p>(a) the provision of information for carriers;</p> <p>(b) the notification of competent authorities; and</p> <p>(c) the possession of certificates and instructions.</p>	<p><u>Information for carriers</u></p> <p>Paragraph 554. The <i>consignor</i> shall provide in the transport documents a statement regarding actions, if any, that are required to be taken by the <i>carrier</i>. The statement shall be in the languages deemed necessary by the <i>carrier</i> or the authorities concerned and shall include at least the following points:</p> <p>(a) Supplementary requirements for loading, stowage, carriage, handling and unloading of the <i>package</i>, <i>overpack</i> or <i>freight container</i>, including any special stowage provisions for the safe dissipation of heat (see para. 565), or a statement that no such requirements are necessary;</p> <p>(b) Restrictions on the mode of transport or <i>conveyance</i> and any necessary routeing instructions;</p> <p>(c) Emergency arrangements appropriate to the <i>consignment</i>.</p> <p>Paragraph 555. The <i>consignor</i> shall retain a copy of each of the transport documents containing the information specified in paras 546, 547, 551, 552 and 554, as applicable, for a minimum period of three months.</p> <p>When the documents are kept electronically, the <i>consignor</i> shall be able to reproduce them in a printed form.</p> <p>Paragraph 556. The applicable <i>competent authority</i> certificates need not necessarily accompany the <i>consignment</i>. The <i>consignor</i> shall make the applicable certificates available to the <i>carrier(s)</i> before loading and unloading.</p> <p><u>Notification of competent authorities</u></p> <p>Paragraph 557. Before the first <i>shipment</i> of any <i>package</i> requiring <i>competent authority</i> approval, the <i>consignor</i> shall ensure that copies of each applicable <i>competent authority</i> certificate applying to that <i>package design</i> have been submitted to the <i>competent authority</i> of the country of origin of the <i>shipment</i> and to the <i>competent authority</i> of each country <i>through or into</i> which the <i>consignment</i> is to be transported. The <i>consignor</i></p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	<p>is not required to await an acknowledgement from the <i>competent authority</i>, nor is the <i>competent authority</i> required to make such acknowledgement of receipt of the certificate.</p> <p>Paragraph 558. For each <i>shipment</i> listed in (a), (b), (c) or (d) below, the <i>consignor</i> shall notify the <i>competent authority</i> of the country of origin of the <i>shipment</i> and the <i>competent authority</i> of each country <i>through or into</i> which the <i>consignment</i> is to be transported. This notification shall be in the possession of each <i>competent authority</i> prior to the commencement of the <i>shipment</i>, preferably at least 7 days in advance of the <i>shipment</i>. The <i>shipments</i> that require <i>consignor</i> notification include:</p> <ul style="list-style-type: none"> <li>(a) <i>Type C packages</i> containing <i>radioactive material</i> with an activity greater than 3000A<sub>1</sub> or 3000A<sub>2</sub>, as appropriate, or 1000 TBq, whichever is the lower;</li> <li>(b) <i>Type B(U) packages</i> containing <i>radioactive material</i> with an activity greater than 3000A<sub>1</sub> or 3000A<sub>2</sub>, as appropriate, or 1000 TBq, whichever is the lower;</li> <li>(c) <i>Type B(M) packages</i>;</li> <li>(d) <i>Shipments under special arrangement</i>.</li> </ul> <p>Paragraph 559. The <i>consignment</i> notification shall include:</p> <ul style="list-style-type: none"> <li>(a) Sufficient information to enable the identification of the <i>package</i> or <i>packages</i>, including all applicable certificate numbers and identification marks.</li> <li>(b) Information on the date of <i>shipment</i>, the expected date of arrival and the proposed routeing.</li> <li>(c) The name(s) of the <i>radioactive material(s)</i> or nuclide(s).</li> <li>(d) Descriptions of the physical and chemical forms of the <i>radioactive material</i>, or whether it is <i>special form radioactive material</i> or <i>low dispersible radioactive material</i>.</li> <li>(e) The maximum activity of the <i>radioactive contents</i> during transport expressed in units of becquerels (Bq) with the appropriate SI prefix symbol (see Annex II). For <i>fissile material</i>, the mass of <i>fissile material</i> (or the mass of each <i>fissile nuclide</i> for a mixture, when appropriate) in units of grams (g), or multiples thereof, may be used in place of activity.</li> </ul> <p>Paragraph 560. The <i>consignor</i> is not required to send a separate notification if the required information has been included in the application for <i>approval of shipment</i> (see para. 827).</p> <p><u>Possession of certificates and instructions</u></p> <p>Paragraph 561. The <i>consignor</i> shall have in his/her possession a copy of each certificate required under Section VIII of these Regulations and a copy of the instructions with regard to the proper closing of the package and other preparations for <i>shipment</i> before making any <i>shipment</i> under the terms of the certificates.</p>
(3) The consignor must advise the consignee that the material is going to be transported.	

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
<p>(4) Every carrier of radioactive material must</p> <p>(a) comply, in respect of transport and storage, with the requirements of the <b>IAEA Regulations</b> except in respect of placarding;</p> <p>(b) transport the material in accordance with the consignor's instructions; and</p> <p>(c) implement and maintain work procedures to ensure compliance with these Regulations and keep a record</p>	<p>TRANSPORT AND STORAGE IN TRANSIT</p> <p><u>Segregation during transport and storage in transit</u></p> <p>Paragraph 562. <i>Packages, overpacks and freight containers</i> containing <i>radioactive material</i> and unpackaged radioactive material shall be segregated during transport and during storage in transit:</p> <p>(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;</p> <p>(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;</p> <p>(c) From undeveloped photographic film by distances calculated using a radiation exposure criterion for undeveloped photographic film due to the transport of <i>radioactive material</i> of 0.1 mSv per <i>consignment</i> of such film;</p> <p>(d) From other dangerous goods in accordance with para. 506.</p> <p>Paragraph 563. Category II-YELLOW or III-YELLOW <i>packages or overpacks</i> shall not be carried in compartments occupied by passengers, except those exclusively reserved for couriers specially authorized to accompany such <i>packages or overpacks</i>.</p> <p><u>Stowage during transport and storage in transit</u></p> <p>Paragraph 564. <i>Consignments</i> shall be securely stowed.</p> <p>Paragraph 565. Provided that its average surface heat flux does not exceed 15 W/m<sup>2</sup> and that the immediate surrounding cargo is not in sacks or bags, a <i>package or overpack</i> may be carried or stored among packaged general cargo without any special stowage provisions except as may be specifically required by the <i>competent authority</i> in an applicable certificate of <i>approval</i>.</p> <p>Paragraph 566. Loading of <i>freight containers</i> and accumulation of <i>packages, overpacks and freight containers</i> shall be controlled as follows:</p> <p>(a) Except under the condition of <i>exclusive use</i>, and for <i>consignments of LSA-I material</i>, the total number of <i>packages, overpacks and freight containers</i> aboard a single <i>conveyance</i> shall be limited so that the sum of the <i>TIs</i> aboard the <i>conveyance</i> does not exceed the values shown in Table 10.</p> <p>(b) The <i>dose rate</i> under routine conditions of transport shall not exceed 2 mSv/h at any point on the external surface of the <i>vehicle or freight container</i>, and 0.1 mSv/h at 2 m from the external surface of the <i>vehicle or freight container</i>, except for <i>consignments</i> transported under <i>exclusive use</i> by road or rail for which the radiation limits around the <i>vehicle</i> are set forth in para. 573(b) and 573(c).</p> <p>(c) The sum of the <i>CSIs</i> in a <i>freight container</i> and aboard a <i>conveyance</i> shall not exceed the values shown in Table 11.</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	<p>Paragraph 567. Any <i>package</i> or <i>overpack</i> having a <i>TI</i> greater than 10, or any <i>consignment</i> having a <i>CSI</i> greater than 50, shall be transported only under <i>exclusive use</i>.</p> <p><u>Additional requirements relating to transport and storage in transit of fissile material</u></p> <p>Paragraph 568. Any group of <i>packages</i>, <i>overpacks</i> and <i>freight containers</i> containing <i>fissile material</i> stored in transit in any one storage area shall be so limited that the sum of the <i>CSIs</i> 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.</p> <p>Paragraph 569. Where the sum of the <i>CSIs</i> on board a <i>conveyance</i> or in a <i>freight container</i> exceeds 50, as permitted in Table 11, storage shall be such as to maintain a spacing of at least 6 m from other groups of <i>packages</i>, <i>overpacks</i> or <i>freight containers</i> containing <i>fissile material</i> or other <i>conveyances</i> carrying <i>radioactive material</i>.</p> <p>Paragraph 570. <i>Fissile material</i> meeting one of the provisions (a)–(f) of para. 417 shall meet the following requirements:</p> <ul style="list-style-type: none"> <li>(a) Only one of the provisions (a)–(f) of para. 417 is allowed per <i>consignment</i>.</li> <li>(b) Only one approved <i>fissile material</i> in <i>packages</i> classified in accordance with para. 417(f) is allowed per <i>consignment</i> unless multiple materials are authorized in the certificate of <i>approval</i>.</li> <li>(c) <i>Fissile material</i> in <i>packages</i> classified in accordance with para. 417(c) shall be transported in a <i>consignment</i> with no more than 45 g of <i>fissile nuclides</i>.</li> <li>(d) <i>Fissile material</i> in <i>packages</i> classified in accordance with para. 417(d) shall be transported in a <i>consignment</i> with no more than 15 g of <i>fissile nuclides</i>.</li> <li>(e) Unpackaged or packaged <i>fissile material</i> classified in accordance with para. 417(e) shall be transported under <i>exclusive use</i> on a <i>conveyance</i> with no more than 45 g of <i>fissile nuclides</i>.</li> </ul> <p>Paragraph 573. For <i>consignments</i> under <i>exclusive use</i>, the <i>dose rate</i> shall not exceed:</p> <ul style="list-style-type: none"> <li>(a) 10 mSv/h at any point on the external surface of any <i>package</i> or <i>overpack</i>, and may only exceed 2 mSv/h provided that: <ul style="list-style-type: none"> <li>(i) The <i>vehicle</i> is equipped with an enclosure that, during routine conditions of transport, prevents the access of unauthorized persons to the interior of the enclosure.</li> <li>(ii) Provisions are made to secure the <i>package</i> or <i>overpack</i> so that its position within the <i>vehicle</i> enclosure remains fixed during routine conditions of transport.</li> <li>(iii) There is no loading or unloading during the <i>shipment</i>.</li> </ul> </li> <li>(b) 2 mSv/h at any point on the outer surfaces of the <i>vehicle</i>, including the upper and lower surfaces, or, in the case of an open <i>vehicle</i>, at any point on the vertical planes projected from the outer edges of the</li> </ul>



<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	<p><i>vehicle</i>, on the upper surface of the load, and on the lower external surface of the <i>vehicle</i>.</p> <p>(c) 0.1 mSv/h at any point 2 m from the vertical planes represented by the outer lateral surfaces of the <i>vehicle</i>, or, if the load is transported in an open <i>vehicle</i>, at any point 2 m from the vertical planes projected from the outer edges of the <i>vehicle</i>.</p> <p>Paragraph 574. In the case of road <i>vehicles</i>, no persons other than the driver and assistants shall be permitted in <i>vehicles</i> carrying <i>packages</i>, <i>overpacks</i> or <i>freight containers</i> bearing category II-YELLOW or III-YELLOW labels.</p> <p><u>Additional requirements relating to transport by vessels</u></p> <p>Paragraph 575. <i>Packages</i> or <i>overpacks</i> having a surface <i>dose rates</i> greater than 2 mSv/h, unless being carried in or on a <i>vehicle</i> under <i>exclusive use</i> in accordance with Table 10, footnote (a), shall not be transported by <i>vessel</i> except under <i>special arrangement</i>.</p> <p>Paragraph 576. The transport of <i>consignments</i> by means of a special use <i>vessel</i> that, by virtue of its <i>design</i>, or by reason of its being chartered, is dedicated to the purpose of carrying <i>radioactive material</i>, shall be excepted from the requirements specified in para. 566 provided that the following conditions are met:</p> <p>(a) A <i>radiation protection programme</i> for the <i>shipment</i> shall be approved by the <i>competent authority</i> of the flag state of the <i>vessel</i> and, when requested, by the <i>competent authority</i> at each port of call.</p> <p>(b) Stowage arrangements shall be predetermined for the whole voyage, including any <i>consignments</i> to be loaded at ports of call en route.</p> <p>(c) The loading, carriage and unloading of the <i>consignments</i> shall be supervised by persons qualified in the transport of <i>radioactive material</i>.</p> <p><u>Additional requirements relating to transport by air</u></p> <p>Paragraph 577. <i>Type B(M) packages</i> and <i>consignments</i> under <i>exclusive use</i> shall not be transported on passenger <i>aircraft</i>.</p> <p>Paragraph 578. Vented <i>Type B(M) packages</i>, <i>packages</i> that require external cooling by an ancillary cooling system, <i>packages</i> subject to operational controls during transport and <i>packages</i> containing liquid pyrophoric materials shall not be transported by air.</p> <p>Paragraph 579. <i>Packages</i> or <i>overpacks</i> having a surface <i>dose rates</i> greater than 2 mSv/h shall not be transported by air except by <i>special arrangement</i>.</p> <p><u>Additional requirements relating to transport by post</u></p> <p>Paragraph 580. A <i>consignment</i> that conforms to the requirements of para. 515, in which the activity of the <i>radioactive contents</i> does not exceed one tenth of the limits prescribed in Table 4, and that does not contain uranium hexafluoride, may be accepted for domestic movement by</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	<p>national postal authorities, subject to such additional requirements as those authorities may prescribe.</p> <p>Paragraph 581. A <i>consignment</i> that conforms to the requirements of para. 515, in which the activity of the <i>radioactive contents</i> does not exceed one tenth of the limits prescribed in Table 4, and that does not contain uranium hexafluoride, may be accepted for international movement by post, subject in particular to the following additional requirements as prescribed by the Acts of the Universal Postal Union:</p> <p>(a) The <i>consignment</i> shall be deposited with the postal service only by <i>consignors</i> authorized by the national authority.</p> <p>(b) The <i>consignment</i> shall be dispatched by the quickest route, normally by air.</p> <p>(c) The <i>consignment</i> shall be plainly and durably marked on the outside with the words "RADIOACTIVE MATERIAL — QUANTITIES PERMITTED FOR MOVEMENT BY POST". These words shall be crossed out if the <i>packaging</i> is returned empty.</p> <p>(d) The <i>consignment</i> shall carry on the outside the name and address of the <i>consignor</i> with the request that the <i>consignment</i> be returned in the case of non-delivery.</p> <p>(e) The name and address of the <i>consignor</i> and the contents of the <i>consignment</i> shall be indicated on the internal <i>packaging</i>.</p>
<p>26. (1) A consignor may present for transport and a carrier may transport</p> <p>(a) radioactive material if the material is contained in</p> <p>(i) an excepted package,</p> <p>(ii) a Type IP-1, Type IP-2 or Type IP-3 package,</p> <p>(iii) a Type A package,</p> <p>(iv) a Type B or Type C package of a certified design,</p> <p>(v) a package of a certified design used to transport fissile material, or</p> <p>(vi) a package of a certified design used to transport 0.1 kg or more of uranium hexafluoride;</p> <p>(b) the following if a licence has been issued for that purpose under subsection 24(2) of the <i>Act</i>:</p> <p>(i) a nuclear substance contained in a large object,</p> <p>(ii) a nuclear substance whose transport does not meet all of the requirements of these Regulations,</p> <p>(iii) a nuclear substance whose transport requires a special use vessel,</p>	

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
(iv) a nuclear substance whose transport requires multilateral approval of shipments in accordance with the <b>IAEA Regulations</b> , and	<p>Paragraph 825. <i>Multilateral approval</i> shall be required for:</p> <p>(a) The <i>shipment of Type B(M) packages</i> not conforming with the requirements of para. 639 or designed to allow controlled intermittent venting.</p> <p>(b) The <i>shipment of Type B(M) packages containing radioactive material</i> with an activity greater than 3000A<sub>1</sub> or 3000A<sub>2</sub>, as appropriate, or 1000 TBq, whichever is the lower.</p> <p>(c) The <i>shipment of packages containing fissile material</i> if the sum of the CSIs of the <i>packages</i> in a single <i>freight container</i> or in a single <i>conveyance</i> exceeds 50. Excluded from this requirement shall be <i>shipments</i> by sea-going vessels, if the sum of the CSIs does not exceed 50 for any hold, compartment or <i>defined deck area</i> and the distance of 6 m between groups of <i>packages</i> or <i>overpacks</i>, as required in Table 11, is met.</p> <p>(d) <i>Radiation protection programmes</i> for <i>shipments</i> by special use vessels in accordance with para. 576(a).</p> <p>(e) The <i>shipment of SCO-III</i>.</p>
(v) a package that is in transit and is of a design that has been approved as a Type B(U)-96 or Type C-96 package by a foreign competent authority in accordance with the <b>IAEA Regulations</b> ;	This is a general reference to conducting competent authority approvals in accordance with the IAEA Regulations.
(c) unpackaged LSA-I material or an unpackaged SCO-I, in accordance with the <b>IAEA Regulations</b> ; and	<p>Paragraph 520. <i>LSA material</i> and <i>SCO</i> in groups <i>LSA-I</i>, <i>SCO-I</i> and <i>SCO-III</i> may be transported, unpackaged, under the following conditions:</p> <p>(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 <i>radioactive contents</i> from the <i>conveyance</i> nor will there be any loss of shielding.</p> <p>(b) Each <i>conveyance</i> shall be under <i>exclusive use</i>, except when only transporting <i>SCO-I</i> on which the <i>contamination</i> on the accessible and the inaccessible surfaces is not greater than 10 times the applicable level specified in para. 214.</p> <p>(c) For <i>SCO-I</i> where it is suspected that <i>non-fixed contamination</i> exists on inaccessible surfaces in excess of the values specified in para. 413(a)(i), measures shall be taken to ensure that the <i>radioactive material</i> is not released into the <i>conveyance</i>.</p> <p>(d) Unpackaged <i>fissile material</i> shall meet the requirement of para. 417(e).</p> <p>(e) For <i>SCO-III</i>;</p> <p>(i) Transport shall be under <i>exclusive use</i> by road, rail, inland waterway or sea.</p> <p>(ii) Stacking shall not be permitted.</p> <p>(iii) All activities associated with the <i>shipment</i>, including radiation protection, emergency response and any special precautions or special</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	<p>administrative or operational controls that are to be employed during transport shall be described in a transport plan. The transport plan shall demonstrate that the overall level of safety in transport is at least equivalent to that which would be provided if the requirements of para. 648 (only for the test specified in para. 724, preceded by the tests specified in paras 720 and 721) had been met.</p> <p>(iv) The requirements of para. 624 for a <i>Type IP-2 package</i> shall be satisfied, except that the maximum damage referred to in para. 722 may be determined based on provisions in the transport plan, and the requirements of para. 723 are not applicable.</p> <p>(v) The object and any shielding are secured to the <i>conveyance</i> in accordance with para. 607.</p> <p>(vi) The <i>shipment</i> shall be subject to <i>multilateral approval</i>.</p>
(d) a package that contains 0.1 kg or more of uranium hexafluoride and that is of a design that has been approved as a Type H(U)-96 package by a foreign competent authority in accordance with the <b>IAEA Regulations</b> .	This is a general reference to conducting competent authority approvals in accordance with the IAEA Regulations.
(2) The activity or mass of the radioactive material contained in the package must be within the applicable limit for that type of package as set out (a) in the <b>IAEA Regulations</b> ; (b) in any applicable certificate; and	<p><b>CLASSIFICATION OF PACKAGES</b></p> <p>Paragraph 421. The quantity of <i>radioactive material</i> in a <i>package</i> shall not exceed the relevant limits for the <i>package</i> type as specified below.</p> <p><u>Classification as excepted package</u></p> <p>Paragraph 422. A <i>package</i> may be classified as an <i>excepted package</i> if it meets one of the following conditions:</p> <p>(a) It is an empty <i>package</i> having contained <i>radioactive material</i>;</p> <p>(b) It contains instruments or articles not exceeding the activity limits specified in Table 4;</p> <p>(c) It contains articles manufactured of <i>natural uranium, depleted uranium</i> or natural thorium;</p> <p>(d) It contains <i>radioactive material</i> not exceeding the activity limits specified in Table 4;</p> <p>(e) It contains less than 0.1 kg of uranium hexafluoride not exceeding the activity limits specified in column 4 of Table 4.</p> <p>[See the IAEA Regulations for Table 4, <i>Activity Limits for Excepted Packages</i>.]</p> <p>Paragraph 423. <i>Radioactive material</i> that is enclosed in or is included as a component part of an instrument or other manufactured article, may be classified under UN 2911, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE — INSTRUMENTS or ARTICLES, provided that:</p> <p>(a) The <i>dose rate</i> at 10 cm from any point on the external surface of any unpackaged instrument or article is not greater than 0.1 mSv/h.</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	<p>(b) Each instrument or article bears the mark "RADIOACTIVE" on its external surface except for the following:</p> <ul style="list-style-type: none"> <li>(i) Radioluminescent timepieces or devices do not require marks.</li> <li>(ii) Consumer products that have either received regulatory <i>approval</i> in accordance with para. 107(e) or do not individually exceed the activity limit for an exempt <i>consignment</i> in Table 2 (column 5) do not require marks, provided that such products are transported in a <i>package</i> that bears the mark "RADIOACTIVE" on its internal surface in such a manner that a warning of the presence of <i>radioactive material</i> is visible on opening the <i>package</i>.</li> <li>(iii) Other instruments or articles too small to bear the mark "RADIOACTIVE" do not require marks, provided that they are transported in a <i>package</i> that bears the mark "RADIOACTIVE" on its internal surface in such a manner that a warning of the presence of <i>radioactive material</i> is visible on opening the <i>package</i>.</li> </ul> <p>(c) The active material is completely enclosed by non-active components (a device performing the sole function of containing <i>radioactive material</i> shall not be considered to be an instrument or manufactured article).</p> <p>(d) The limits specified in columns 2 and 3 of Table 4 are met for each individual item and each <i>package</i>, respectively.</p> <p>(e) For transport by post, the total activity in each <i>excepted package</i> shall not exceed one tenth of the relevant limits specified in column 3 of Table 4.</p> <p>(f) If the <i>package</i> contains <i>fissile material</i>, one of the provisions of subparagraphs (a)–(f) of para. 417 shall apply.</p> <p>Paragraph 424. <i>Radioactive material</i> in forms other than as specified in para. 423 and with an activity not exceeding the limits specified in column 4 of Table 4 may be classified under UN 2910, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE — LIMITED QUANTITY OF MATERIAL, provided that:</p> <ul style="list-style-type: none"> <li>(a) The <i>package</i> retains its <i>radioactive contents</i> under routine conditions of transport.</li> <li>(b) The <i>package</i> bears the mark "RADIOACTIVE" on either: <ul style="list-style-type: none"> <li>(i) An internal surface in such a manner that a warning of the presence of <i>radioactive material</i> is visible on opening the <i>package</i>; or</li> <li>(ii) The outside of the <i>package</i>, where it is impractical to mark an internal surface.</li> </ul> </li> <li>(c) For transport by post, the total activity in each <i>excepted package</i> shall not exceed one tenth of the relevant limits specified in column 4 of Table 4.</li> <li>(d) If the <i>package</i> contains <i>fissile material</i>, one of the provisions of subparagraphs (a)–(f) of para. 417 shall apply</li> </ul>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	<p>Paragraph 425. Uranium hexafluoride not exceeding the limits specified in column 4 of Table 4 may be classified under UN 3507 URANIUM HEXAFLUORIDE, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE, less than 0.1 kg per <i>package</i>, non-fissile or fissile-excepted, provided that:</p> <ul style="list-style-type: none"> <li>(a) The mass of uranium hexafluoride in the <i>package</i> is less than 0.1 kg.</li> <li>(b) The conditions of paras 420, 424(a) and 424(b) are met.</li> </ul> <p><u>Additional requirements and controls for transport of empty packagings</u></p> <p>Paragraph 427. An empty <i>packaging</i> that had previously contained <i>radioactive material</i> may be classified under UN 2908, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE — EMPTY PACKAGING, provided that:</p> <ul style="list-style-type: none"> <li>(a) It is in a well-maintained condition and securely closed.</li> <li>(b) The outer surface of any <i>uranium</i> or thorium in its structure is covered with an inactive sheath made of metal or some other substantial material.</li> <li>(c) The level of internal <i>non-fixed contamination</i> does not exceed 100 times the levels specified in para. 508.</li> <li>(d) Any labels that may have been displayed on it in conformity with para. 538 are no longer visible.</li> <li>(e) If the <i>packaging</i> has contained <i>fissile material</i>, one of the provisions of subparagraphs (a)–(f) of para. 417 or one of the provisions for exclusion in para. 222 shall apply.</li> </ul> <p>Paragraph 429. <i>Type A packages</i> shall not contain activities greater than either of the following:</p> <ul style="list-style-type: none"> <li>(a) For <i>special form radioactive material</i> — <math>A_1</math>;</li> <li>(b) For all other <i>radioactive material</i> — <math>A_2</math>.</li> </ul> <p>Paragraph 430. For mixtures of radionuclides whose identities and respective activities are known, the following condition shall apply to the <i>radioactive contents</i> of a <i>Type A package</i>:</p> $\sum_i \frac{B(i)}{A_1(i)} + \sum_j \frac{C(j)}{A_2(j)} \leq 1$ <p>Where</p> <ul style="list-style-type: none"> <li><math>B(i)</math> is the activity of radionuclide <math>i</math> as <i>special form radioactive material</i>;</li> <li><math>A_1(i)</math> is the <math>A_1</math> value for radionuclide <math>i</math>;</li> <li><math>C(j)</math> is the activity of radionuclide <math>j</math> as other than <i>special form radioactive material</i>;</li> <li><math>A_2(j)</math> is the <math>A_2</math> value for radionuclide <math>j</math>.</li> </ul> <p>Paragraph 433. <i>Type B(U)</i> and <i>Type B(M) packages</i>, if transported by air, shall meet the requirements of para. 432 and shall not contain activities greater than the following:</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	<p>(a) For <i>low dispersible radioactive material</i> — as authorized for the <i>package design</i> as specified in the certificate of <i>approval</i>;</p> <p>(b) For <i>special form radioactive material</i> — 3000A<sub>1</sub> or 10<sup>5</sup>A<sub>2</sub>, whichever is the lower;</p> <p>(c) For all other <i>radioactive material</i> — 3000A<sub>2</sub>.</p>
(c) in any applicable approval issued by a foreign competent authority in accordance with the <b>IAEA Regulations</b> .	This is a general reference to conducting competent authority approvals in accordance with the IAEA Regulations.
<p>(3) Despite subsection (1), a package that does not require certification by the Commission and whose design meets the requirements of the 1985 or 1985 (as amended in 1990) edition of the <b>IAEA Regulations</b> may be used if</p> <p>(a) the package meets the applicable requirements of section 25; and</p> <p>(b) the packaging was neither manufactured nor modified after December 31, 2003.</p> <p>(4) Despite subsection (1), a package manufactured to a package design certified under the requirements of the 1973, 1973 (as amended), 1985 or 1985 (as amended in 1990) edition of the <b>IAEA Regulations</b> may continue to be used if</p> <p>(a) the package meets the applicable requirements of section 25;</p> <p>(b) its manufacture began before</p> <p>(i) January 1, 1996, for designs that meet the requirements of the 1973 or 1973 (as amended) edition of the <b>IAEA Regulations</b>, or</p> <p>(ii) January 1, 2007, for designs that meet the requirements of the 1985 or 1985 (as amended in 1990) edition of the <b>IAEA Regulations</b>; or</p> <p>(c) it contains fissile material that meets the applicable requirements for fissile material of the editions of the <b>IAEA Regulations</b> issued after 2009.</p>	See the <a href="#">IAEA's website</a> for more information about the various editions of the IAEA regulations.
(5) For packages prepared in accordance with the requirements of an edition of the <b>IAEA Regulations</b> before the 2012 edition, if the material was considered fissile-excepted radioactive material under that earlier edition, and if it is neither excluded from the definition of fissile material nor excepted from the provisions applicable to fissile material in the editions of those Regulations issued after 2009, the package may be transported, provided that it is under exclusive use and the following formula yields a result of less than one:	<p>Paragraph 222. <i>Fissile nuclides</i> shall mean uranium-233, uranium-235, plutonium-239 and plutonium-241. <i>Fissile material</i> shall mean a material containing any of the <i>fissile nuclides</i>. Excluded from the definition of <i>fissile material</i> are the following:</p> <p>(a) <i>Natural uranium</i> or <i>depleted uranium</i> that is unirradiated;</p> <p>(b) <i>Natural uranium</i> or <i>depleted uranium</i> that has been irradiated in thermal reactors only;</p> <p>(c) Material with <i>fissile nuclides</i> less than a total of 0.25 g;</p> <p>(d) Any combination of (a), (b) and/or (c).</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
<p>(A/B) + (C/D) Where</p> <p>A is the mass in grams of uranium-235; B is 400 if the fissile material is mixed with substances that have an average hydrogen density less than or equal to water, or 290 in all other cases; C is the mass in grams of all other fissile nuclides, as defined in the <b>IAEA Regulations</b>; and D is 250 if the fissile material is mixed with substances that have an average hydrogen density less than or equal to water, or 180 in all other cases.</p>	<p>These exclusions are only valid if there is no other material with <i>fissile nuclides</i> in the <i>package</i> or in the <i>consignment</i> if shipped unpackaged.</p>
<p>27. (1) Subject to subsections (2) and (3), both LSA material and an SCO must be transported in Type IP-3 packages.</p>	
<p>(2) LSA-I material and an SCO-I may be transported unpackaged in accordance with the <b>IAEA Regulations</b>, but must be transported in a manner that ensures that, under routine conditions of transport, there will be no escape of the radioactive contents from the conveyance or any loss of shielding.</p>	<p>Paragraph 520. <i>LSA material</i> and <i>SCO</i> in groups <i>LSA-I</i>, <i>SCO-I</i> and <i>SCO-III</i> may be transported, unpackaged, under the following conditions:</p> <p>(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 <i>radioactive contents</i> from the <i>conveyance</i> nor will there be any loss of shielding.</p> <p>(b) Each <i>conveyance</i> shall be under <i>exclusive use</i>, except when only transporting <i>SCO-I</i> on which the <i>contamination</i> on the accessible and the inaccessible surfaces is not greater than 10 times the applicable level specified in para. 214.</p> <p>(c) For <i>SCO-I</i> where it is suspected that <i>non-fixed contamination</i> exists on inaccessible surfaces in excess of the values specified in para. 413(a)(i), measures shall be taken to ensure that the <i>radioactive material</i> is not released into the <i>conveyance</i>.</p> <p>(d) Unpackaged <i>fissile material</i> shall meet the requirement of para. 417(e).</p> <p>(e) For <i>SCO-III</i>;</p> <p>(i) Transport shall be under <i>exclusive use</i> by road, rail, inland waterway or sea.</p> <p>(ii) Stacking shall not be permitted.</p> <p>(iii) All activities associated with the <i>shipment</i>, including radiation protection, emergency response and any special precautions or special administrative or operational controls that are to be employed during transport shall be described in a transport plan. The transport plan shall demonstrate that the overall level of safety in transport is at least equivalent to that which would be provided if the requirements of para. 648 (only for the test specified in para. 724, preceded by the tests specified in paras 720 and 721) had been met.</p>



<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	<p>(iv) The requirements of para. 624 for a <i>Type IP-2 package</i> shall be satisfied, except that the maximum damage referred to in para. 722 may be determined based on provisions in the transport plan, and the requirements of para. 723 are not applicable.</p> <p>(v) The object and any shielding are secured to the <i>conveyance</i> in accordance with para. 607.</p> <p>(vi) The <i>shipment</i> shall be subject to <i>multilateral approval</i>.</p>
<p>(3) LSA material and an SCO may be transported in Type IP-1 packages and Type IP-2 packages in accordance with the <b>IAEA Regulations</b> if the LSA material and the SCO</p> <p>(a) are transported in conveyances that are not carrying passengers;</p> <p>(b) are transported in conveyances or freight containers from one consignor only; and</p> <p>(c) are only loaded at the consignor's location and unloaded at the consignee's location.</p>	<p>Paragraph 521. <i>LSA material</i> and <i>SCO</i>, except as otherwise specified in para. 520, shall be packaged in accordance with Table 5.</p>
<p>28. (1) Consignors and carriers of radioactive material must comply with the <b>IAEA Regulations</b> in respect of</p> <p>(a) requirements to be met before the first shipment and before each shipment;</p>	<p>REQUIREMENTS BEFORE THE FIRST SHIPMENT</p> <p>Paragraph 501. Before a <i>packaging</i> is first used to transport <i>radioactive material</i>, it shall be confirmed that it has been manufactured in conformity with the <i>design</i> specifications to ensure compliance with the relevant provisions of these Regulations and any applicable certificate of <i>approval</i>. The following requirements shall also be fulfilled, if applicable:</p> <p>(a) If the <i>design</i> pressure of the <i>containment system</i> exceeds 35 kPa (gauge), it shall be ensured that the <i>containment system</i> of each <i>packaging</i> conforms to the approved <i>design</i> requirements relating to the capability of that system to maintain its integrity under that pressure.</p> <p>(b) For each <i>packaging</i> intended for use as a <i>Type B(U)</i>, <i>Type B(M)</i> or <i>Type C package</i> and for each <i>packaging</i> intended to contain <i>fissile material</i>, it shall be ensured that the effectiveness of its shielding and containment and, where necessary, the heat transfer characteristics and the effectiveness of the <i>confinement system</i>, are within the limits applicable to or specified for the approved <i>design</i>.</p> <p>(c) For each <i>packaging</i> intended to contain <i>fissile material</i>, it shall be ensured that the effectiveness of the criticality safety features is within the limits applicable to or specified for the <i>design</i>, and in particular where, in order to comply with the requirements of para. 673, neutron poisons are specifically included, checks shall be performed to confirm the presence and distribution of those neutron poisons.</p> <p>REQUIREMENTS BEFORE EACH SHIPMENT</p> <p>Paragraph 502. Before each <i>shipment</i> of any <i>package</i>, it shall be ensured that the <i>package</i> contains neither:</p> <p>(a) Radionuclides different from those specified for the <i>package design</i>; nor</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	<p>(b) Contents in a form, or physical or chemical state, different from those specified for the <i>package design</i></p> <p>Paragraph 503. Before each <i>shipment</i> of any <i>package</i>, it shall be ensured that all the requirements specified in the relevant provisions of these Regulations and in the applicable certificates of <i>approval</i> have been fulfilled. The following requirements shall also be fulfilled, if applicable:</p> <p>(a) It shall be ensured that lifting attachments that do not meet the requirements of para. 608 have been removed or otherwise rendered incapable of being used for lifting the <i>package</i>, in accordance with para. 609.</p> <p>(b) Each <i>Type B(U)</i>, <i>Type B(M)</i> and <i>Type C package</i> shall be held until equilibrium conditions have been approached closely enough to demonstrate compliance with the requirements for temperature and pressure, unless an exemption from these requirements has received <i>unilateral approval</i>.</p> <p>(c) For each <i>Type B(U)</i>, <i>Type B(M)</i> and <i>Type C package</i>, it shall be ensured by inspection and/or appropriate tests that all closures, valves and other openings of the <i>containment system</i> through which the <i>radioactive contents</i> might escape are properly closed and, where appropriate, sealed in the manner for which the demonstrations of compliance with the requirements of paras 659 and 671 were made.</p> <p>(d) For <i>packages</i> containing <i>fissile material</i>, the measurement specified in para. 677(b) and the tests to demonstrate closure of each <i>package</i> as specified in para. 680 shall be performed.</p> <p>(e) For <i>packages</i> intended to be used for <i>shipment</i> after storage, it shall be ensured that all <i>packaging</i> components and <i>radioactive contents</i> have been maintained during storage in a manner such that all the requirements specified in the relevant provisions of these Regulations and in the applicable certificates of <i>approval</i> have been fulfilled.</p>
(b) requirements for the transport of other goods;	<p>TRANSPORT OF OTHER GOODS</p> <p>Paragraph 504. A <i>package</i> shall not contain any items other than those that are necessary for the use of the <i>radioactive material</i>. The interaction between these items and the <i>package</i>, under the conditions of transport applicable to the <i>design</i>, shall not reduce the safety of the <i>package</i>.</p> <p>Paragraph 505. <i>Freight containers, IBCs, tanks</i>, as well as other <i>packagings</i> and <i>overpacks</i>, used for the transport of <i>radioactive material</i> shall not be used for the storage or transport of other goods unless decontaminated below the level of 0.4 Bq/cm<sup>2</sup> for beta and gamma emitters and <i>low toxicity alpha emitters</i> and 0.04 Bq/cm<sup>2</sup> for all other alpha emitters.</p> <p>Paragraph 506. <i>Consignments</i> shall be segregated from other dangerous goods during transport in compliance with the relevant transport regulations for dangerous goods of each of the countries <i>through or into</i> which the materials will be transported, and, where applicable, with the</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	regulations of the cognizant transport organizations, as well as these Regulations.
(c) requirements and controls for contamination and for leaking packages;	<p>REQUIREMENTS AND CONTROLS FOR CONTAMINATION AND FOR LEAKING PACKAGES</p> <p>Paragraph 508. The <i>non-fixed contamination</i> on the external surfaces of any <i>package</i> shall be kept as low as practicable and, under routine conditions of transport, shall not exceed the following limits:</p> <ul style="list-style-type: none"> <li>(a) 4 Bq/cm<sup>2</sup> for beta and gamma emitters and <i>low toxicity alpha emitters</i>;</li> <li>(b) 0.4 Bq/cm<sup>2</sup> for all other alpha emitters.</li> </ul> <p>These limits are applicable when averaged over any area of 300 cm<sup>2</sup> of any part of the surface.</p> <p>Paragraph 509. Except as provided in para. 514, the level of <i>non-fixed contamination</i> on the external and internal surfaces of <i>overpacks</i>, <i>freight containers</i> and <i>conveyances</i> shall not exceed the limits specified in para. 508. This requirement does not apply to the internal surfaces of <i>freight containers</i> being used as <i>packagings</i>, either loaded or empty.</p> <p>Paragraph 510. If it is evident that a <i>package</i> is damaged or leaking, or if it is suspected that the <i>package</i> may have leaked or been damaged, access to the <i>package</i> shall be restricted and a qualified person shall, as soon as possible, assess the extent of <i>contamination</i> and the resultant <i>dose rate</i> of the <i>package</i>. The scope of the assessment shall include the package, the <i>conveyance</i>, the adjacent loading and unloading areas and, if necessary, all other material that has been carried in the <i>conveyance</i>. When necessary, additional steps for the protection of people, property and the environment, in accordance with provisions established by the relevant <i>competent authority</i>, shall be taken to overcome and minimize the consequences of such leakage or damage.</p> <p>Paragraph 511. <i>Packages</i> that are damaged or leaking <i>radioactive contents</i> 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.</p> <p>Paragraph 512. A <i>conveyance</i> and equipment used regularly for the transport of <i>radioactive material</i> shall be periodically checked to determine the level of <i>contamination</i>. The frequency of such checks shall be related to the likelihood of <i>contamination</i> and the extent to which <i>radioactive material</i> is transported.</p> <p>Paragraph 513. Except as provided in para. 514, any <i>conveyance</i>, or equipment or part thereof that has become contaminated above the limits specified in para. 508 in the course of the transport of <i>radioactive material</i>, or that shows a <i>dose rate</i> in excess of 5 µSv/h at the surface, shall be decontaminated as soon as possible by a qualified person and shall not be reused unless the following conditions are fulfilled:</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	<p>(a) The <i>non-fixed contamination</i> shall not exceed the limits specified in para. 508.</p> <p>(b) The <i>dose rate</i> resulting from the fixed <i>contamination</i> shall not exceed 5 <math>\mu\text{Sv/h}</math> at the surface.</p> <p>Paragraph 514. A <i>freight container</i> or <i>conveyance</i> dedicated to the transport of unpackaged <i>radioactive material</i> under <i>exclusive use</i> shall be excepted from the requirements of paras 509 and 513 solely with regard to its internal surfaces and only for as long as it remains under that specific <i>exclusive use</i>.</p>
(d) requirements and controls for transport of excepted packages;	<p>REQUIREMENTS AND CONTROLS FOR TRANSPORT OF EXCEPTED PACKAGES</p> <p>Paragraph 515. <i>Excepted packages</i> shall be subject only to the following provisions in Sections V and VI:</p> <p>(a) The requirements specified in paras 503–505; 507–513; 516; 530–533; 545; 546 introductory sentence; 546(a); 546(j),(i) and (ii); 546(k); 546(m); 550–553; 555; 556; 561; 564; 570; 582 and 583;</p> <p>(b) The requirements for <i>excepted packages</i> specified in para. 622;</p> <p>(c) The requirements specified in paras 580 and 581, if transported by post.</p> <p>All relevant provisions of the other sections shall apply to excepted packages.</p> <p>Paragraph 516. The <i>dose rate</i> at any point on the external surface of an <i>excepted package</i> shall not exceed 5 <math>\mu\text{Sv/h}</math>.</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>										
(e) the determination of the transport index;	<p><b>DETERMINATION OF TRANSPORT INDEX</b></p> <p>Paragraph 523. The <i>TI</i> for a <i>package</i>, <i>overpack</i> or <i>freight container</i>, or for unpackaged <i>LSA-I</i>, <i>SCO-I</i>, or <i>SCO-III</i> shall be the number derived in accordance with the following procedure:</p> <p>(a) Determine the maximum <i>dose rate</i> in units of millisieverts per hour (mSv/h) at a distance of 1 m from the external surfaces of the <i>package</i>, <i>overpack</i>, <i>freight container</i> or unpackaged <i>LSA-I</i>, <i>SCO-I</i> and <i>SCO-III</i>. The value determined shall be multiplied by 100. For <i>uranium</i> and thorium ores and their concentrates, the maximum <i>dose rate</i> at any point 1 m from the external surface of the load may be taken as:</p> <p>(i) 0.4 mSv/h for ores and physical concentrates of <i>uranium</i> and thorium;</p> <p>(ii) 0.3 mSv/h for chemical concentrates of thorium;</p> <p>(iii) 0.02 mSv/h for chemical concentrates of <i>uranium</i>, other than uranium hexafluoride.</p> <p>(b) For <i>tanks</i>, <i>freight containers</i> and unpackaged <i>LSA-I</i>, <i>SCO-I</i> and <i>SCO-III</i>, the value determined in step (a) shall be multiplied by the appropriate factor from Table 7.</p> <p>(c) The value obtained in steps (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 and the resulting number is the <i>TI</i> value.</p> <p>Paragraph 524. The <i>TI</i> for each rigid <i>overpack</i>, <i>freight container</i> or <i>conveyance</i> shall be determined as the sum of the <i>TIs</i> of all the <i>packages</i> contained therein. For a <i>shipment</i> from a single <i>consignor</i>, the <i>consignor</i> may determine the <i>TI</i> by direct measurement of <i>dose rate</i>.</p> <p>Paragraph 524A. The <i>TI</i> for a non-rigid <i>overpack</i> shall be determined only as the sum of the <i>TIs</i> of all the <i>packages</i> within the <i>overpack</i>.</p> <p>Table 7. MULTIPLICATION FACTORS FOR TANKS, FREIGHT CONTAINERS AND UNPACKAGED LSA-I, SCO-I AND SCO-III</p> <table border="1" data-bbox="743 1497 1515 1707"> <thead> <tr> <th>Size of load<sup>a</sup></th> <th>Multiplication factor</th> </tr> </thead> <tbody> <tr> <td>size of load ≤ 1 m<sup>2</sup></td> <td>1</td> </tr> <tr> <td>1 m<sup>2</sup> &lt; size of load ≤ 5 m<sup>2</sup></td> <td>2</td> </tr> <tr> <td>5 m<sup>2</sup> &lt; size of load ≤ 20 m<sup>2</sup></td> <td>3</td> </tr> <tr> <td>20 m<sup>2</sup> &lt; size of load</td> <td>10</td> </tr> </tbody> </table> <p><sup>a</sup> Largest cross-sectional area of the load being measured.</p>	Size of load <sup>a</sup>	Multiplication factor	size of load ≤ 1 m <sup>2</sup>	1	1 m <sup>2</sup> < size of load ≤ 5 m <sup>2</sup>	2	5 m <sup>2</sup> < size of load ≤ 20 m <sup>2</sup>	3	20 m <sup>2</sup> < size of load	10
Size of load <sup>a</sup>	Multiplication factor										
size of load ≤ 1 m <sup>2</sup>	1										
1 m <sup>2</sup> < size of load ≤ 5 m <sup>2</sup>	2										
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20 m <sup>2</sup> < size of load	10										

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
(f) the determination of the criticality safety index;	<p>DETERMINATION OF CRITICALITY SAFETY INDEX FOR CONSIGNMENTS, FREIGHT CONTAINERS AND OVERPACKS</p> <p>Paragraph 525. The <i>CSI</i> for each <i>overpack</i> or <i>freight container</i> shall be determined as the sum of the <i>CSIs</i> of all the <i>packages</i> contained. The same procedure shall be followed for determining the total sum of the <i>CSIs</i> in a <i>consignment</i> or aboard a <i>conveyance</i>.</p>
(g) the limits on the transport index, criticality safety index and radiation levels;	<p>LIMITS ON TRANSPORT INDEX, CRITICALITY SAFETY INDEX AND DOSE RATES FOR PACKAGES AND OVERPACKS</p> <p>Paragraph 526. Except for <i>consignments</i> under <i>exclusive use</i>, the <i>TI</i> of any <i>package</i> or <i>overpack</i> shall not exceed 10, nor shall the <i>CSI</i> of any <i>package</i> or <i>overpack</i> exceed 50.</p> <p>Paragraph 527. Except for <i>packages</i> or <i>overpacks</i> transported under <i>exclusive use</i> by rail or by road under the conditions specified in para. 573(a), or under <i>exclusive use</i> and <i>special arrangement</i> by vessel or by air under the conditions specified in para. 575 or para. 579, respectively, the maximum <i>dose rate</i> at any point on the external surface of a <i>package</i> or <i>overpack</i> shall not exceed 2 mSv/h.</p> <p>Paragraph 528. The maximum <i>dose rate</i> at any point on the external surface of a <i>package</i> or <i>overpack</i> under <i>exclusive use</i> shall not exceed 10 mSv/h.</p>
(h) the determination of categories for packages, overpacks and freight containers; and	<p>CATEGORIES</p> <p>Paragraph 529. <i>Packages</i>, <i>overpacks</i> and <i>freight containers</i> shall be assigned to either category I-WHITE, II-YELLOW or III-YELLOW in accordance with the conditions specified in Table 8 and with the following requirements:</p> <p>(a) For a <i>package</i>, <i>overpack</i> or <i>freight container</i>, the <i>TI</i> and the surface <i>dose rate</i> conditions shall be taken into account in determining which category is appropriate. Where the <i>TI</i> satisfies the condition for one category but the surface <i>dose rate</i> satisfies the condition for a different category, the <i>package</i>, <i>overpack</i> or <i>freight container</i> shall be assigned to the higher category. For this purpose, category I-WHITE shall be regarded as the lowest category.</p> <p>(b) The <i>TI</i> shall be determined following the procedures specified in paras 523, 524 and 524A.</p> <p>(c) If the surface <i>dose rate</i> is greater than 2 mSv/h, the <i>package</i> or <i>overpack</i> shall be transported under <i>exclusive use</i> and under the provisions of paras 573(a), 575 or 579, as appropriate.</p> <p>(d) A <i>package</i> transported under a <i>special arrangement</i> shall be assigned to category III-YELLOW except under the provisions of para. 530.</p> <p>(e) An <i>overpack</i> or <i>freight container</i> that contains <i>packages</i> transported under <i>special arrangement</i> shall be assigned to category III-YELLOW except under the provisions of para. 530.</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
<p>(i) the marking and labelling of packages, overpacks and freight containers, except that the figures illustrating labels found in the <b>IAEA Regulations</b> must be replaced by the corresponding illustrations for Class 7 radioactive materials that are set out in the Appendix to Part 4 of the <b>Transportation of Dangerous Goods Regulations</b>.</p>	<p><b>MARKING, LABELLING AND PLACARDING</b></p> <p>Paragraph 530. For each <i>package</i> or <i>overpack</i>, the UN number and proper shipping name shall be determined (see Table 1). In all cases of international transport of <i>packages</i> requiring <i>competent authority approval</i> of <i>design</i> or <i>shipment</i>, for which different <i>approval</i> types apply in the different countries concerned by the <i>shipment</i>, the UN number, proper shipping name, categorization, labelling and marking shall be in accordance with the certificate of the country of origin of <i>design</i>.</p> <p><b>Marking</b></p> <p>Paragraph 531. Each <i>package</i> shall be legibly and durably marked on the outside of the <i>packaging</i> with an identification of either the <i>consignor</i> or <i>consignee</i>, or both. Each <i>overpack</i> shall be legibly and durably marked on the outside of the <i>overpack</i> with an identification of either the <i>consignor</i> or <i>consignee</i>, or both, unless these marks of all the <i>packages</i> within the <i>overpack</i> are clearly visible.</p> <p>Paragraph 532. Each <i>package</i> shall be legibly and durably marked on the outside with the UN marks as specified in Table 9. Additionally, each <i>overpack</i> shall be legibly and durably marked with the word "OVERPACK" and the UN marks as specified in Table 9, unless all the marks of the <i>packages</i> within the <i>overpack</i> are clearly visible.</p> <p>Paragraph 533. Each <i>package</i> of gross mass exceeding 50 kg shall have its permissible gross mass legibly and durably marked on the outside of the <i>packaging</i>.</p> <p>Paragraph 534. Each <i>package</i> that conforms to:</p> <p>(a) An <i>IP-1</i>, <i>IP-2</i> or <i>IP-3 design</i> shall be legibly and durably marked on the outside of the <i>packaging</i> with "TYPE IP-1", "TYPE IP-2" or "TYPE IP-3", as appropriate.</p> <p>(b) A <i>Type A package design</i> shall be legibly and durably marked on the outside of the <i>packaging</i> with "TYPE A".</p> <p>(c) An <i>IP-2</i>, <i>IP-3</i> or a <i>Type A package design</i> shall be legibly and durably marked on the outside of the <i>packaging</i> with the international <i>vehicle</i> registration code (VRI code) of the country of origin of <i>design</i> and either the name of the manufacturer or other identification of the <i>packaging</i> specified by the <i>competent authority</i> of the country of origin of <i>design</i>.</p> <p>Paragraph 535. Each <i>package</i> that conforms to a <i>design</i> approved under one or more of paras 807–816 and 820 shall be legibly and durably marked on the outside of the <i>packaging</i> with the following information:</p> <p>(a) The identification mark allocated to that <i>design</i> by the <i>competent authority</i>;</p> <p>(b) A serial number to uniquely identify each <i>packaging</i> that conforms to that <i>design</i>;</p> <p>(c) "TYPE B(U)", "TYPE B(M)" or "TYPE C", in the case of a <i>Type B(U)</i>, <i>Type B(M)</i> or <i>Type C package design</i>.</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	<p>Paragraph 536. Each <i>package</i> that conforms to a <i>Type B(U)</i>, <i>Type B(M)</i> or <i>Type C package design</i> shall have the outside of the outermost receptacle, that is resistant to the effects of fire and water, plainly marked by embossing, stamping or other means resistant to the effects of fire and water with the trefoil symbol shown in Fig. 1.</p> <p>Paragraph 536A. Any mark on the <i>package</i> made in accordance with the requirements of paras 534(a) and (b) and 535(c) relating to the <i>package</i> type that does not relate to the UN number and proper shipping name assigned to the <i>consignment</i> shall be removed or covered.</p> <p>Paragraph 537. Where <i>LSA-I</i> or <i>SCO-I</i> material is contained in receptacles or wrapping materials and is transported under <i>exclusive use</i>, as permitted by para. 520, the outer surface of these receptacles or wrapping materials may bear the mark "RADIOACTIVE LSA-I" or "RADIOACTIVE SCO-I", as appropriate.</p> <p><u>Labelling</u></p> <p>Paragraph 538. Each <i>package</i>, <i>overpack</i> and <i>freight container</i> shall bear the labels conforming to the applicable models in Figs 2–4, except as allowed under the alternative provisions of para. 543 for <i>large freight containers</i> and <i>tanks</i>, according to the appropriate category. In addition, each <i>package</i>, <i>overpack</i> and <i>freight container</i> containing <i>fissile material</i>, other than <i>fissile material</i> excepted under the provisions of para. 417, shall bear labels conforming to the model in Fig. 5. Any labels that do not relate to the contents shall be removed or covered. For <i>radioactive material</i> having other dangerous properties, see para. 507.</p> <p>Paragraph 539. The labels conforming to the applicable models in Figs 2–4 shall be affixed to two opposite sides of the outside of a <i>package</i> or <i>overpack</i> or on the outside of all four sides of a <i>freight container</i> or <i>tank</i>. The labels conforming to the model in Fig. 5, where applicable, shall be affixed adjacent to the labels conforming to the applicable models in Figs 2–4. The labels shall not cover the marks specified in paras 531–536.</p> <p><u>Labelling for radioactive contents</u></p> <p>Paragraph 540. Each label conforming to the applicable models in Figs 2–4 shall be completed with the following information:</p> <p>(a) Contents:</p> <p>(i) Except for <i>LSA-I material</i>, the name(s) of the radionuclide(s) as taken from Table 2, using the symbols prescribed therein. For mixtures of radionuclides, the most restrictive nuclides must be listed to the extent the space on the line permits. The group of <i>LSA</i> or <i>SCO</i> shall be shown following the name(s) of the radionuclide(s). The terms <i>LSA-II</i>, <i>LSA-III</i>, <i>SCO-I</i> and <i>SCO-II</i> shall be used for this purpose.</p> <p>(ii) For <i>LSA-I material</i>, the term <i>LSA-I</i> is all that is necessary; the name of the radionuclide is not necessary.</p> <p>(b) Activity: The maximum activity of the <i>radioactive contents</i> during transport expressed in units of becquerels (Bq) with the appropriate SI prefix symbol (see Annex II). For <i>fissile material</i>, the total mass of <i>fissile</i></p>



<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	<p><i>nuclides</i> in units of grams (g), or multiples thereof, may be used in place of activity.</p> <p>(c) For <i>overpacks</i> and <i>freight containers</i>, the “contents” and “activity” entries on the label shall bear the information required in para. 540(a) and 540(b), respectively, totalled together for the entire contents of the <i>overpack</i> or <i>freight container</i> except that on labels for <i>overpacks</i> or <i>freight containers</i> containing mixed loads of packages containing different radionuclides, such entries may read “See Transport Documents”.</p> <p>(d) <i>Tl</i>: The number determined in accordance with paras 523, 524 and 524A (except for category I-WHITE).</p> <p><u>Labelling for criticality safety</u></p> <p>Paragraph 541. Each label conforming to the model in Fig. 5 shall be completed with the <i>CSI</i> as stated in the certificate of <i>approval</i> applicable in the countries <i>through or into</i> which the <i>consignment</i> is transported and issued by the <i>competent authority</i> or as specified in para. 674 or para. 675.</p> <p>Paragraph 542. For <i>overpacks</i> and <i>freight containers</i>, the label conforming to the model in Fig. 5 shall bear the sum of the <i>CSIs</i> of all the <i>packages</i> contained therein.</p> <p>See illustrations for Class 7 radioactive materials in the Appendix to Part 4 of the <a href="#">Transportation of Dangerous Goods Regulations</a>.</p>
<p>(2) Despite subsection (1), a consignor may present for transport and a carrier may transport, by road, radioactive material in a package, or a package within an overpack, that is not labelled in accordance with the <b>IAEA Regulations</b>, if</p> <p>(a) the package or overpack contains or is an exposure device of a model that is certified, and</p> <p>(i) the package or overpack is transported with goods from one consignor only and in a conveyance that is not carrying passengers,</p> <p>(ii) the package or overpack is transported in a conveyance that displays on each side and on each end a placard for Class 7 radioactive materials as set out in the Appendix to Part 4 of the <b>Transportation of Dangerous Goods Regulations</b>, and</p> <p>(iii) both the package and the overpack, if one is used, are clearly marked with the word “RADIOACTIVE” or “RADIOACTIF”;</p> <p>(b) the package is an excepted package; or</p> <p>(c) the package or overpack contains only LSA-I material other than uranium hexafluoride and</p>	<p>See illustrations for Class 7 radioactive materials in the Appendix to Part 4 of the <a href="#">Transportation of Dangerous Goods Regulations</a>.</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
<p>(i) the package or overpack is transported with goods from one consignor only and in a conveyance that is not carrying passengers,</p> <p>(ii) the package or overpack is only loaded at the consignor's location and unloaded at the consignee's location,</p> <p>(iii) the package or overpack is transported by road in a conveyance or freight container that displays on each side and on each end a placard for Class 7 radioactive materials as set out in the Appendix to Part 4 of the <b>Transportation of Dangerous Goods Regulations</b>, and</p> <p>(iv) both the package and the overpack, if one is used, are clearly marked with the words "RADIOACTIVE LSA-I" or "LSA-I RADIOACTIF".</p>	
<p>(3) For the purpose of subsection (2), "certified" and "exposure device" have the same meaning as in section 1 of the <b>Nuclear Substances and Radiation Devices Regulations</b>.</p>	<p><a href="#"><u>Nuclear Substances and Radiation Devices Regulations</u></a></p> <p>"certified" means certified by the Commission under paragraph 21(1)(h) or (i) of the Act or by a designated officer authorized under paragraph 37(2)(a) or (b) of the Act. (homologué)</p> <p>"exposure device" means a radiation device that is designed for carrying out gamma radiography, and includes any accessory to the device such as a sealed source assembly, a drive mechanism, a sealed source assembly guide tube and an exposure head. (appareil d'exposition)</p>
<p>(4) Despite subsection (1), a consignor may present for transport and a carrier may transport radioactive material in accordance with the <b>International Maritime Dangerous Goods Code</b> or the <b>Technical Instructions for the Safe Transport of Dangerous Goods by Air</b>.</p>	<p><i>International Maritime Dangerous Goods Code</i> [2] <i>Technical Instructions for the Safe Transport of Dangerous Goods by Air</i> [3]</p>
<p>(5) If the English and French versions of the <b>IAEA Regulations</b> each prescribe the use of a word, the word prescribed by either version may be used.</p>	
<p>29. (1) Every consignor of radioactive material must include in the transport documents for the consignment the particulars of consignment that are required by the <b>IAEA Regulations</b>, which particulars must be clearly and indelibly printed.</p>	<p><u>Particulars of consignment</u></p> <p>Paragraph 546. The <i>consignor</i> shall include in the transport documents with each <i>consignment</i> the identification of the <i>consignor</i> and <i>consignee</i>, including their names and addresses, and the following information, as applicable, in the order given:</p> <p>(a) The UN number assigned to the material as specified in accordance with the provisions of paras 401 and 530, preceded by the letters "UN".</p> <p>(b) The proper shipping name, as specified in accordance with the provisions of paras 401 and 530.</p> <p>(c) The UN dangerous goods class number "7".</p> <p>(d) The subsidiary hazard class or division number(s) corresponding to the subsidiary hazard label(s) required to be applied, when assigned,</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	<p>shall be entered following the primary hazard class or division and shall be enclosed in parentheses.</p> <p>(e) The name or symbol of each radionuclide or, for mixtures of radionuclides, an appropriate general description or a list of the most restrictive nuclides.</p> <p>(f) A description of the physical and chemical form of the material, or a notation that the material is <i>special form radioactive material</i> or <i>low dispersible radioactive material</i>. A generic chemical description is acceptable for chemical form.</p> <p>(g) The maximum activity of the <i>radioactive contents</i> during transport expressed in units of becquerels (Bq) with the appropriate SI prefix symbol (see Annex II). For <i>fissile material</i>, the mass of <i>fissile material</i> (or mass of each <i>fissile nuclide</i> for mixtures, when appropriate) in units of grams (g), or appropriate multiples thereof, may be used in place of activity.</p> <p>(h) The category of the <i>package, overpack or freight container</i>, as assigned per para. 529, i.e. I-WHITE, II-YELLOW, III-YELLOW.</p> <p>(i) The <i>Tl</i> as determined per paras 523, 524 and 524A (except for category I-WHITE).</p> <p>(j) For <i>fissile material</i>:</p> <ul style="list-style-type: none"> <li>(i) Shipped under one exception of subparagraphs 417(a)–(f), reference to that paragraph;</li> <li>(ii) Shipped under para. 417(c)–(e), the total mass of <i>fissile nuclides</i>;</li> <li>(iii) Contained in a <i>package</i> for which one of para. 674(a)–(c) or 675 is applied, reference to that paragraph;</li> <li>(iv) The CSI, where applicable.</li> </ul> <p>(k) The identification mark for each <i>competent authority</i> certificate of approval (<i>special form radioactive material, low dispersible radioactive material, fissile material</i> excepted under para. 417(f), <i>special arrangement, package design or shipment</i>) applicable to the <i>consignment</i>.</p> <p>(l) For <i>consignments</i> of more than one <i>package</i>, the information contained in para. 546(a)–(k) shall be given for each <i>package</i>. For <i>packages</i> in an <i>overpack, freight container or conveyance</i>, a detailed statement of the contents of each <i>package</i> within the <i>overpack, freight container or conveyance</i> and, where appropriate, of each <i>overpack, freight container or conveyance</i> shall be included. If <i>packages</i> are to be removed from the <i>overpack, freight container or conveyance</i> at a point of intermediate unloading, appropriate transport documents shall be made available.</p> <p>(m) Where a <i>consignment</i> is required to be shipped under <i>exclusive use</i>, the statement “EXCLUSIVE USE SHIPMENT”.</p> <p>(n) For <i>LSA-II, LSA-III, SCO-I, SCO-II</i> and <i>SCO-III</i>, the total activity of the <i>consignment</i> as a multiple of <math>A_2</math>. For <i>radioactive material</i> for which the <math>A_2</math> value is unlimited, the multiple of <math>A_2</math> shall be zero.</p>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
(2) Subsection (1) does not apply (a) to an excepted package if the transport documents contain the following information: (i) the identification of the consignor and consignee, (ii) the United Nations number assigned to the material as set out in the <b>IAEA Regulations</b> , preceded by the letters "UN", (iii) the proper shipping name as set out in the <b>IAEA Regulations</b> , (iv) the identification mark for the certification described in each of sections 12 to 14, as applicable, and	See Section IV, Table 1, Excerpts from the List of UN Numbers, Proper Shipping Names and Descriptions in the IAEA Regulations.
(v) the identification mark of any applicable special form radioactive material approval issued by a foreign competent authority in accordance with the <b>IAEA Regulations</b> ; or	This is a general reference to conducting competent authority approvals in accordance with the IAEA Regulations.
(b) to a consignor who provides transport documents that have been prepared in accordance with the <b>International Maritime Dangerous Goods Code</b> or the <b>Technical Instructions for the Safe Transport of Dangerous Goods by Air</b> .	<i>International Maritime Dangerous Goods Code</i> [2] <i>Technical Instructions for the Safe Transport of Dangerous Goods by Air</i> [3]
(3) Every carrier who transports a consignment of radioactive material must ensure that it is accompanied by the transport documents referred to in subsection (1) or (2).	
(4) The transport documents in respect of radioactive material that is in an exposure device, referred to in paragraph 28(2)(a), transported in accordance with that paragraph do not need to meet the requirements set out in the <b>IAEA Regulations</b> for the category of the package and transport index.	Paragraph 546. The <i>consignor</i> shall include in the transport documents with each <i>consignment</i> the identification of the <i>consignor</i> and <i>consignee</i> , including their names and addresses, and the following information, as applicable, in the order given: [...] (h) The category of the <i>package, overpack or freight container</i> , as assigned per para. 529, i.e. I-WHITE, II-YELLOW, III-YELLOW. (i) The <i>Ti</i> as determined per paras 523, 524 and 524A (except for category I-WHITE).
<b>RADIATION PROTECTION</b>	
<b>DEFINITIONS</b>	
30. For the purposes of sections 31 and 33, "committed", "equivalent dose" and "radon progeny" have the same meaning as in subsection 1(1) of the <b>Radiation Protection Regulations</b> .	<a href="#"><u>Radiation Protection Regulations</u></a> "committed" means, in respect of a dose of radiation, received by an organ or tissue from a nuclear substance during the 50 years after the substance is taken into the body of a person 18 years old or older or during the period beginning at intake and ending at age 70, after it is taken into the body of a person less than 18 years old. (engagée) "equivalent dose" means the product, in sievert, obtained by multiplying the absorbed dose of radiation of the type set out in column 1 of an item

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>																		
	<p>of Schedule 2 by the weighting factor set out in column 2 of that item. (dose équivalente)</p> <p>“radon progeny” means the following radioactive decay products of radon 222: bismuth 214, lead 214, polonium 214 and polonium 218. (produit de filiation du radon)</p>																		
<b>RADIATION PROTECTION PROGRAM</b>																			
<p>31. (1) Every consignor, carrier or consignee of radioactive material, other than one who only handles or transports excepted packages, must implement a radiation protection program and must, as part of that program,</p> <p>(a) keep the amount of exposure to radon progeny and the effective dose and equivalent dose received by and committed to persons as low as reasonably achievable, taking into account social and economic factors, through the implementation of</p> <p>(i) management control over work practices,</p> <p>(ii) personnel qualification and training,</p> <p>(iii) control of exposure to radiation by personnel and the public, and</p> <p>(iv) planning for unusual situations;</p> <p>(b) prevent persons from receiving doses of radiation higher than the radiation dose limits prescribed by the <b>Radiation Protection Regulations</b>;</p> <p>(c) assess the radiation at the workplace and</p> <p>(i) conduct workplace or individual monitoring if it may reasonably be expected that the doses of radiation received by persons at the workplace will be 1 mSv or more but less than 5 mSv a year, or</p> <p>(ii) conduct individual monitoring if it may reasonably be expected that the doses of radiation received by persons at the workplace will be 5 mSv a year or more; and</p> <p>(d) train the persons referred to in the program on the application of the program.</p> <p>(2) Every consignor, carrier or consignee must</p> <p>(a) keep a record documenting their radiation protection program and of any information collected under it; and</p> <p>(b) retain the record for a period ending two years after the day on which the information is collected.</p> <p>32. Every consignor, carrier or consignee who becomes aware that a dose of radiation received by a person</p>	<p><a href="#">Radiation Protection Regulations</a></p> <p>EFFECTIVE DOSE LIMITS</p> <p>13. (1) Every licensee shall ensure that the effective dose received by and committed to a person described in column 1 of an item of the table to this subsection, during the period set out in column 2 of that item, does not exceed the effective dose set out in column 3 of that item.</p> <p style="text-align: center;">TABLE</p> <table border="1" data-bbox="727 758 1511 1119"> <thead> <tr> <th>Item</th> <th>Column 1 Person</th> <th>Column 2 Period</th> <th>Column 3 Effective Dose (mSv)</th> </tr> </thead> <tbody> <tr> <td rowspan="2">1.</td> <td rowspan="2">Nuclear energy worker, including a pregnant nuclear energy worker</td> <td>(a) One-year dosimetry period</td> <td>50</td> </tr> <tr> <td>(b) Five-year dosimetry period</td> <td>100</td> </tr> <tr> <td>2.</td> <td>Pregnant nuclear energy worker</td> <td>Balance of the pregnancy</td> <td>4</td> </tr> <tr> <td>3.</td> <td>A person who is not a nuclear energy worker</td> <td>One calendar year</td> <td>1</td> </tr> </tbody> </table> <p>(2) For the purpose of item 1 of the table to subsection (1), the effective dose shall be calculated using the following formula and expressed in millisievert:</p> $E + 5RnP + 20 \sum \frac{I}{ALI}$ <p>(3) For the purpose of item 2 of the table to subsection (1), the effective dose shall be calculated using the following formula and expressed in millisievert:</p> $E + 20 \sum \frac{I}{ALI}$ <p>(4) For the purpose of item 3 of the table to subsection (1), the effective dose shall be calculated using either of the following formulas and expressed in millisievert:</p> $E + \frac{Rn}{60} + 20 \sum \frac{I}{ALI}$ $E + 4RnP + 20 \sum \frac{I}{ALI}$ <p>(5) For the purpose of subsection (1), where the end of a dosimeter-wearing period or a bioassay-sampling period does not coincide with the</p>	Item	Column 1 Person	Column 2 Period	Column 3 Effective Dose (mSv)	1.	Nuclear energy worker, including a pregnant nuclear energy worker	(a) One-year dosimetry period	50	(b) Five-year dosimetry period	100	2.	Pregnant nuclear energy worker	Balance of the pregnancy	4	3.	A person who is not a nuclear energy worker	One calendar year	1
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<p>may have exceeded an applicable dose limit prescribed by the <b>Radiation Protection Regulations</b> must</p> <p>(a) immediately notify the person and the Commission of the dose;</p> <p>(b) conduct an investigation to determine the magnitude of the dose and to establish the causes of the exposure;</p> <p>(c) take any action required to prevent the occurrence of a similar incident; and</p> <p>(d) within 21 days after becoming aware that the dose limit may have been exceeded, report to the Commission the results of the investigation or the progress that has been made in conducting it.</p> <p>33. (1) Every consignor, carrier or consignee must inform every nuclear energy worker that they employ, in writing,</p> <p>(a) of the fact that the worker is a nuclear energy worker;</p> <p>(b) of the risks associated with the radiation to which the worker may be exposed in the course of their work, including the risks associated with the exposure of embryos and fetuses to radiation;</p> <p>(c) of the applicable effective dose limits and equivalent dose limits prescribed by sections 13 and 14, respectively, of the <b>Radiation Protection Regulations</b>; and</p> <p>(d) of the worker's radiation dose levels.</p> <p>(2) In the case of a female nuclear energy worker, the consignor, carrier or consignee must</p> <p>(a) inform her, in writing, that she is required, as soon as she is aware that she is pregnant, to inform her employer of that fact in writing;</p> <p>(b) inform her, in writing, of the applicable effective dose limits prescribed by the <b>Radiation Protection Regulations</b>; and</p> <p>(c) on being informed of the pregnancy, make any accommodation that will not result in costs or business inconvenience constituting undue hardship to it to comply with the effective dose limits prescribed by section 13 of the <b>Radiation Protection Regulations</b>.</p> <p>(3) Every consignor, carrier or consignee must obtain from each nuclear energy worker that they employ who is informed of the matters referred to in paragraphs (1)(a) and (b) and subsection (2) a written</p>	<p>end of a dosimetry period set out in column 2 of the table to that subsection, the licensee may extend or reduce the dosimetry period to a maximum of two weeks so that the end of the dosimetry period coincides with the end of the dosimeter-wearing period or bioassay-sampling period, as the case may be.</p> <p><b>EQUIVALENT DOSE LIMITS</b></p> <p>14. (1) Every licensee shall ensure that the equivalent dose received by and committed to an organ or tissue set out in column 1 of an item of the table to this subsection, of a person described in column 2 of that item, during the period set out in column 3 of that item, does not exceed the equivalent dose set out in column 4 of that item.</p> <p style="text-align: center;"><b>TABLE</b></p> <table border="1" data-bbox="727 701 1516 1171"> <thead> <tr> <th>Item</th> <th>Column 1 Organ or Tissue</th> <th>Column 2 Person</th> <th>Column 3 Period</th> <th>Column 4 Equivalent Dose (mSv)</th> </tr> </thead> <tbody> <tr> <td rowspan="2">1.</td> <td rowspan="2">Lens of an eye</td> <td>(a) Nuclear energy worker</td> <td>One-year dosimetry period</td> <td>150</td> </tr> <tr> <td>(b) Any other person</td> <td>One calendar year</td> <td>15</td> </tr> <tr> <td rowspan="2">2.</td> <td rowspan="2">Skin</td> <td>(a) Nuclear energy worker</td> <td>One-year dosimetry period</td> <td>500</td> </tr> <tr> <td>(b) Any other person</td> <td>One calendar year</td> <td>50</td> </tr> <tr> <td rowspan="2">3.</td> <td rowspan="2">Hands and feet</td> <td>(a) Nuclear energy worker</td> <td>One-year dosimetry period</td> <td>500</td> </tr> <tr> <td>(b) Any other person</td> <td>One calendar year</td> <td>50</td> </tr> </tbody> </table> <p>(2) For the purpose of subsection (1), where a dosimeter-wearing period or a bioassay-sampling period extends beyond the end of a dosimetry period set out in column 3 of the table to that subsection, the period is extended to the end of the dosimeter-wearing or bioassay-sampling period or by two weeks, whichever extension is shorter.</p> <p>(3) When skin is unevenly irradiated, the equivalent dose received by the skin is the average equivalent dose over the 1 cm<sup>2</sup> area that received the highest equivalent dose.</p>	Item	Column 1 Organ or Tissue	Column 2 Person	Column 3 Period	Column 4 Equivalent Dose (mSv)	1.	Lens of an eye	(a) Nuclear energy worker	One-year dosimetry period	150	(b) Any other person	One calendar year	15	2.	Skin	(a) Nuclear energy worker	One-year dosimetry period	500	(b) Any other person	One calendar year	50	3.	Hands and feet	(a) Nuclear energy worker	One-year dosimetry period	500	(b) Any other person	One calendar year	50
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acknowledgement that the worker has received the information.	
<b>PERSONAL INFORMATION</b>	
34. (1) If a consignor, carrier or consignee collects personal information, as defined in section 3 of the <b>Privacy Act</b> , that may be required to be disclosed to the Commission, another government institution, as defined in that section, or a dosimetry service, the consignor, carrier or consignee must inform the person to whom the information relates of the purpose for which it is being collected.	<p><a href="#"><u>Privacy Act</u></a></p> <p>“personal information” means information about an identifiable individual that is recorded in any form including, without restricting the generality of the foregoing,</p> <ul style="list-style-type: none"> <li>(a) information relating to the race, national or ethnic origin, colour, religion, age or marital status of the individual,</li> <li>(b) information relating to the education or the medical, criminal or employment history of the individual or information relating to financial transactions in which the individual has been involved,</li> <li>(c) any identifying number, symbol or other particular assigned to the individual,</li> <li>(d) the address, fingerprints or blood type of the individual,</li> <li>(e) the personal opinions or views of the individual except where they are about another individual or about a proposal for a grant, an award or a prize to be made to another individual by a government institution or a part of a government institution specified in the regulations,</li> <li>(f) correspondence sent to a government institution by the individual that is implicitly or explicitly of a private or confidential nature, and replies to such correspondence that would reveal the contents of the original correspondence,</li> <li>(g) the views or opinions of another individual about the individual,</li> <li>(h) the views or opinions of another individual about a proposal for a grant, an award or a prize to be made to the individual by an institution or a part of an institution referred to in paragraph (e), but excluding the name of the other individual where it appears with the views or opinions of the other individual, and</li> <li>(i) the name of the individual where it appears with other personal information relating to the individual or where the disclosure of the name itself would reveal information about the individual,</li> </ul> <p>but, for the purposes of sections 7, 8 and 26 and section 19 of the <a href="#"><u>Access to Information Act</u></a>, does not include</p> <ul style="list-style-type: none"> <li>(j) information about an individual who is or was an officer or employee of a government institution that relates to the position or functions of the individual including, <ul style="list-style-type: none"> <li>(i) the fact that the individual is or was an officer or employee of the government institution,</li> <li>(ii) the title, business address and telephone number of the individual,</li> <li>(iii) the classification, salary range and responsibilities of the position held by the individual,</li> <li>(iv) the name of the individual on a document prepared by the individual in the course of employment, and</li> </ul> </li> </ul>

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
	<p>(v) the personal opinions or views of the individual given in the course of employment,</p> <p>(k) information about an individual who is or was performing services under contract for a government institution that relates to the services performed, including the terms of the contract, the name of the individual and the opinions or views of the individual given in the course of the performance of those services,</p> <p>(l) information relating to any discretionary benefit of a financial nature, including the granting of a licence or permit, conferred on an individual, including the name of the individual and the exact nature of the benefit, and</p> <p>(m) information about an individual who has been dead for more than twenty years;</p>
<p>(2) Every nuclear energy worker whose work requires that they engage in activities that are subject to these Regulations must provide the following information to their employer:</p> <p>(a) their given names, surname and any previous surname;</p> <p>(b) their Social Insurance Number;</p> <p>(c) their gender;</p> <p>(d) their date, province and country of birth; and</p> <p>(e) their dose record, as applicable, for the current one-year dosimetry period and five-year dosimetry period as those terms are defined in subsection 1(1) of the <b><i>Radiation Protection Regulations</i></b>.</p>	<p><a href="#"><u><i>Radiation Protection Regulations</i></u></a></p> <p>“one-year dosimetry period” means the period of one calendar year beginning on January 1 of the year following the year in which these Regulations come into force, and every period of one calendar year after that period. (période de dosimétrie d'un an)</p> <p>“five-year dosimetry period” means the period of five calendar years beginning on January 1 of the year following the year in which these Regulations come into force, and every period of five calendar years after that period. (période de dosimétrie de cinq ans)</p>
<p><b>DANGEROUS OCCURRENCES</b></p>	
<p>35. For the purpose of sections 36 to 38, a dangerous occurrence is any of the following situations:</p> <p>(a) a conveyance carrying radioactive material is involved in an accident;</p> <p>(b) a package shows evidence of damage, tampering or leakage of its contents, or its integrity is degraded in a manner that may reasonably be expected to impair its ability to comply with these Regulations or its certificate;</p> <p>(c) radioactive material is lost, stolen or no longer in the control of a person who is required to have control of it under the Act;</p> <p>(d) radioactive material has escaped from a containment system, a package or a conveyance during transport;</p> <p>(e) fissile material is outside the confinement system during transport;</p>	



<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
<p>(f) the level of non-fixed contamination, as defined in the <b>IAEA Regulations</b>, during transport exceeds the following limits as applicable when averaged over any area of 300 cm<sup>2</sup> of any part of the surface of the package or the conveyance:</p> <ul style="list-style-type: none"> <li>(i) 4 Bq/cm<sup>2</sup> for beta and gamma emitters and low toxicity alpha emitters, or</li> <li>(ii) 0.4 Bq/cm<sup>2</sup> for all other alpha emitters;</li> </ul> <p>(g) there is a failure to comply with the provisions of the <i>Act</i>, the provisions of these Regulations or any licence or certificate that is applicable to a package that may reasonably be expected to lead to a situation in which the environment, the health and safety of persons or national security is adversely affected.</p>	<p>Paragraph 215. Non-fixed contamination shall mean contamination that can be removed from a surface during routine conditions of transport.</p>
<p>36. (1) The consignor, carrier or consignee of a package or radioactive material involved in a dangerous occurrence or any other person who controls any area affected by a dangerous occurrence must immediately</p> <ul style="list-style-type: none"> <li>(a) limit, to the extent possible, the dispersal of any radioactive material;</li> <li>(b) place barriers, signs or personnel at every point of entry into the affected area to control the entry of persons into that area; and</li> <li>(c) record the name, postal address and telephone number of any person who may have been exposed to or contaminated by radioactive material and request that the person remain available for assessment by an expert in radiation protection.</li> </ul>	
<p>(2) As soon as feasible after a dangerous occurrence has occurred the consignor, carrier or consignee of the package or radioactive material involved in the occurrence must have an expert in radiation protection assess the situation. The expert must report the results of the assessment to the Commission as soon as feasible.</p>	
<p>37. (1) Immediately after becoming aware of a failure to comply with the requirements of section 26 or after the obligations set out in subsection 36(1) have been discharged, every consignor, carrier, consignee and holder of a licence to transport a package while in transit must make a preliminary report of the situation to the Commission.</p>	

<b>Packaging and Transport of Nuclear Substances Regulations, 2015</b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
(2) No preliminary report is required for the dangerous occurrence referred to in paragraph 35(f) in respect of the internal surfaces of a tank or intermediate bulk container, as those terms are defined in the <b>IAEA Regulations</b> — or of a freight container or conveyance — that is dedicated to the transport of unpackaged radioactive material under exclusive use for as long as it remains under that specific exclusive use.	Paragraph 224. <i>Intermediate bulk container (IBC)</i> shall mean a portable <i>packaging</i> that: <ul style="list-style-type: none"> <li>(a) Has a capacity of not more than 3 m<sup>3</sup>;</li> <li>(b) Is designed for mechanical handling;</li> <li>(c) Is resistant to the stresses produced during handling and transport, as determined by tests.</li> </ul> Paragraph 242. <i>Tank</i> shall mean a portable <i>tank</i> (including a <i>tank</i> container), a road <i>tank vehicle</i> , a rail <i>tank</i> wagon or a receptacle that contains solids, liquids, or gases, having a capacity of not less than 450 L when used for the transport of gases.
(3) Every carrier, consignee and holder of a licence referred to in subsection (1) must immediately notify the consignor if that person is not already aware of the failure to comply or of the dangerous occurrence.	
(4) All preliminary reports must include information on the location and circumstances of the failure to comply or of the dangerous occurrence and on any action that the consignor carrier, consignee or holder of a licence referred to in subsection (1) has taken or proposes to take with respect to it.	
38. Within 21 days after the failure to comply with the requirements of section 26 or after the dangerous occurrence, the consignor, carrier and consignee and any holder of a licence to transport a package while in transit must file a full report with the Commission that includes the following information: <ul style="list-style-type: none"> <li>(a) the date, time and location of the failure to comply or of the dangerous occurrence;</li> <li>(b) the names of the persons involved;</li> <li>(c) the details of the packaging and packages;</li> <li>(d) the probable cause;</li> <li>(e) the effects on the environment, the health and safety of persons, and national or international security that have resulted or may result;</li> <li>(f) the doses of radiation that any person has received or is likely to have received; and</li> <li>(g) the actions taken to remedy the failure to comply or the dangerous occurrence <i>and</i> to prevent its recurrence.</li> </ul>	

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<b>MISCELLANEOUS PROVISIONS</b>																			
<p>39. For the purpose of the definition “release” in section 2 of the <b>Transportation of Dangerous Goods Act, 1992</b>, the following levels of ionizing radiation are established:</p> <p>(a) in respect of a package that is being transported under exclusive use,</p> <p>(i) 10 mSv/h on the external surface of the package,</p> <p>(ii) 2 mSv/h on the surface of the conveyance, and</p> <p>(iii) 0.1 mSv/h at a distance of 2 m from the surface of the conveyance; and</p> <p>(b) in respect of a package that is not being transported under exclusive use,</p> <p>(i) 2 mSv/h on the external surface of the package,</p> <p>(ii) 0.1 mSv/h at a distance of 1 m from the package,</p> <p>(iii) 2 mSv/h on the surface of the conveyance, and</p> <p>(iv) 0.1 mSv/h at a distance of 2 m from the surface of the conveyance.</p>	<p><a href="#">Transportation of Dangerous Goods Act, 1992</a></p> <p>“release” means, in relation to dangerous goods,</p> <p>(a) a discharge, emission, explosion, outgassing or other escape of dangerous goods, or any component or compound evolving from dangerous goods, from a means of containment being used to handle or transport the dangerous goods, or</p> <p>(b) an emission, from a means of containment being used to handle or transport dangerous goods, of ionizing radiation that exceeds a level or limit established under the <a href="#">Nuclear Safety and Control Act</a>;</p>																		
<p>40. (1) A person, other than the consignor or the consignee of the package, may open a package only if</p> <p>(a) measures are taken to prevent persons from receiving doses of radiation higher than the radiation dose limits prescribed by the <b>Radiation Protection Regulations</b>; and</p> <p>(b) the package is opened in the presence of an expert in radiation protection.</p>	<p><a href="#">Radiation Protection Regulations</a></p> <p>EFFECTIVE DOSE LIMITS</p> <p>13. (1) Every licensee shall ensure that the effective dose received by and committed to a person described in column 1 of an item of the table to this subsection, during the period set out in column 2 of that item, does not exceed the effective dose set out in column 3 of that item.</p> <p>[see next page]</p> <p style="text-align: center;">TABLE</p> <table border="1" data-bbox="727 1308 1511 1682"> <thead> <tr> <th>Item</th> <th>Column 1 Person</th> <th>Column 2 Period</th> <th>Column 3 Effective Dose (mSv)</th> </tr> </thead> <tbody> <tr> <td rowspan="2">1.</td> <td rowspan="2">Nuclear energy worker, including a pregnant nuclear energy worker</td> <td>(a) One-year dosimetry period</td> <td>50</td> </tr> <tr> <td>(b) Five-year dosimetry period</td> <td>100</td> </tr> <tr> <td>2.</td> <td>Pregnant nuclear energy worker</td> <td>Balance of the pregnancy</td> <td>4</td> </tr> <tr> <td>3.</td> <td>A person who is not a nuclear energy worker</td> <td>One calendar year</td> <td>1</td> </tr> </tbody> </table> <p>(2) For the purpose of item 1 of the table to subsection (1), the effective dose shall be calculated using the following formula and expressed in millisievert:</p> $E + 5RnP + 20 \sum I$	Item	Column 1 Person	Column 2 Period	Column 3 Effective Dose (mSv)	1.	Nuclear energy worker, including a pregnant nuclear energy worker	(a) One-year dosimetry period	50	(b) Five-year dosimetry period	100	2.	Pregnant nuclear energy worker	Balance of the pregnancy	4	3.	A person who is not a nuclear energy worker	One calendar year	1
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	<p>(2) For the purpose of subsection (1), where a dosimeter-wearing period or a bioassay-sampling period extends beyond the end of a dosimetry period set out in column 3 of the table to that subsection, the period is extended to the end of the dosimeter-wearing or bioassay-sampling period or by two weeks, whichever extension is shorter.</p> <p>(3) When skin is unevenly irradiated, the equivalent dose received by the skin is the average equivalent dose over the 1 cm<sup>2</sup> area that received the highest equivalent dose.</p>
(2) If a person other than the consignor or the consignee opens a package while in transport, the person must restore the package to a condition that meets the requirements of these Regulations before forwarding it to the consignee.	
(3) Every person who receives a package or who opens a package must, at that time, determine if any of the following conditions exist: <ul style="list-style-type: none"> <li>(a) the package is damaged;</li> <li>(b) the package has been tampered with;</li> <li>(c) if the package contains fissile material, whether any portion of the fissile material is outside the confinement system; and</li> <li>(d) any portion of the contents of the package is outside the containment system.</li> </ul>	
(4) If any of the conditions exist, the person must immediately make a preliminary report to the Commission and to the consignor.	
(5) The preliminary report must include information on how and where the condition was discovered and on any action that the person has taken or proposes to take with respect to it.	
(6) Within 21 days after the condition has been discovered the consignor and the person who made the preliminary report must file a full report with the Commission that includes the following information: <ul style="list-style-type: none"> <li>(a) the date, time and location of the discovery of the condition;</li> <li>(b) the names of the persons involved;</li> <li>(c) the details of the packaging and packages;</li> <li>(d) the probable cause;</li> <li>(e) the effects on the environment, the health and safety of persons, and national or international security that have resulted or may result;</li> <li>(f) the doses of radiation that any person has received or is likely to have received; and</li> </ul>	

<b><i>Packaging and Transport of Nuclear Substances Regulations, 2015</i></b>	<b>Relevant paragraph(s) of the IAEA Regulations and other information as noted</b>
(g) the actions taken to remedy the condition and to prevent its recurrence.	
41. If a consignment cannot be delivered to the consignee, the carrier must (a) notify the consignor, the consignee and the Commission; and (b) keep the consignment in an area to which access is controlled by the carrier until it can be delivered to the consignor or the consignee.	
42. (1) Every person who packs radioactive material in a Type IP-2, Type IP-3 or Type A package must keep a record documenting the following information concerning the package: (a) the technical specifications of its design; (b) the type, quantity and physical state of the radioactive material that it is designed to contain; (c) any document that demonstrates that the package meets the requirements of these Regulations and the management system; and (d) instructions for packing, transport, receiving, maintenance and unpacking. (2) Every person who is required to keep a record must retain it for a period ending two years after the day on which the packing occurs.	

## References

1. International Atomic Energy Agency (IAEA), *Regulations for the Safe Transport of Radioactive Material*, 2018 Edition, Specific Safety Requirements, IAEA Safety Standards Series No. SSR-6, Vienna, 2018.
2. International Maritime Organization, *International Maritime Dangerous Goods Code*, London, 2018.
3. International Civil Aviation Organization, *Technical Instructions for the Safe Transport of Dangerous Goods by Air*, Doc 9284, as amended from time to time.
4. International Organization for Standardization (ISO), *Nuclear Energy – Packaging of Uranium Hexafluoride (UF<sub>6</sub>) for Transport*, ISO 7195, Geneva, 2005.
5. IAEA, No. TS-G-1.4, *The Management System for the Safe Transport of Radioactive Material*, Vienna, 2008.
6. IAEA, No. SSG-26, *Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material*, Vienna, 2018.
7. IAEA, General Safety Requirement Part 3, *Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards*, Vienna, 2014.
8. United Nations, *Recommendations on the Transport of Dangerous Goods, Model Regulations*, ST/SG/AC.10/1/Rev.19, New York and Geneva, 2018.
9. ISO, *Series 1 Freight Containers — Specifications and Testing – Part 1: General Cargo Containers for General Purposes*, ISO 1496, Geneva, 2013.

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