UN/SCETDG/24/INF.61

COMMITTEE OF EXPERTS ON THE TRANSPORT OF DANGEROUS GOODS AND ON THE GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS

Sub-Committee of Experts on the
Transport of Dangerous Goods
Twenty-fourth session
Geneva, 3-10 December 2003
Item 8 of the provisional agenda

HARMONIZATION WITH THE INTERNATIONAL ATOMIC ENERGY AGENCY (IAEA) REGULATIONS FOR THE SAFE TRANSPORT OF RADIOACTIVE MATERIAL

Changes to TS-R-1 recommended by the 10- 14 November 2003 Review Panel meeting for the 2005 edition of the IAEA Transport Regulations

Transmitted by the International Atomic Energy Agency

Recommended Changes to TS-R-1

This paper summarizes the changes to TS-R-1 recommended by the 10 – 14 November Review Panel meeting for the 2005 edition of the IAEA Transport Regulations. These recommended changes resulted from a review of the proposed changes, presented last July as Working Paper ST/SG/AC.10/C.3/2003/3 and the comments received on those proposed changes. As a result of the Review Panel meeting the number of recommended changes is considerably smaller than the original number of proposed changes.

These recommended changes are still subject to approval by the 22-26 March 2004 TRANSSC meeting. At that time there may be some further amendments or deletions.

The TRANSSC approved changes will be presented to the UN SCETDG July 2004 meeting together with the minor changes that were approved already by the 2-6 September 2002 Review Panel meeting in Vienna and presented to the July 2003 UN SCETDG meeting as Working Paper ST/SG/AC.10/C.3/2003/2. The combined approved changes that will be presented in July 2004 will represent all the changes recommended for the 2005 editions of both the IAEA and the UN Model Regulations.

The changes recommended by the 10 –14 November 2003 Review Panel meeting are presented in a table, in IAEA paragraph order. The related UN paragraphs are identified. The text has not yet been modified in accordance with UN format. A summary of the corresponding changes in UN format is presented by the UN Secretariat in UN/SCETDG/24/INF.23.

The current IAEA text and the new IAEA text are presented side by side in order to easily identify what change has been recommended. Where the change involves a deletion of text from the current regulations the part to be deleted is marked in **bold** in the current text. Where the approved change involves new or revised text the new or revised part is marked in **bold** in the new text.

DECISIONS OF THE NOVEMBER 2003 REVIEW PANEL MEETING FOR APPROVAL BY TRANSSC IX

Change	IAEA para	UN para	Existing text in TS-R-1 (2003)	Text Recommended by Review Panel No. 2
1	204	2.72	204. *Multilateral approval* shall mean approval by the relevant *competent authority* **both** of the country of origin of the *design* or *shipment* and of each country through or into which the *consignment* is to be transported. The term "through or into" specifically excludes "over", i.e. the approval and notification requirements shall not apply to a country over which *radioactive material* is carried in an *aircraft*, provided that there is no scheduled stop in that country.	204. *Multilateral approval* shall mean approval by the relevant *competent authority* of the country of origin of the *design* or *shipment*, **as applicable,** and **also, where the *consignment* is to be transported through or into any other country, approval by the *competent authority* of that country.** The term "through or into" specifically excludes "over", i.e. the approval and notification requirements shall not apply to a country over which *radioactive material* is carried in an *aircraft*, provided that there is no scheduled stop in that country.
3	212	Already in 5.4.1.3	212. *Consignor* shall mean any person, organization or government which prepares a *consignment* for transport**, and is named as *consignor* in the transport documents**.	212. *Consignor* shall mean any person, organization or government which prepares a *consignment* for transport. 549. The *consignor* shall include in the transport documents with each *consignment* **the identification of the consignor and consignee, including their names and addresses and** the following information, as applicable in the order given:
4	222	2.7.2	*Fissile material* 222. *Fissile material* shall mean uranium-233, uranium-235, plutonium-239, plutonium-241, or any combination of these radionuclides. Excepted from this - definition is: (a) *natural uranium* or *depleted uranium* which is unirradiated, and (b) *natural uranium* or *depleted uranium* which has been irradiated in thermal reactors only.	*Fissile – **nuclides**, material* 222. *Fissile nuclides* shall mean uranium-233, uranium-235, plutonium-239 and plutonium-241. *Fissile material* shall mean a material containing any of the *fissile nuclides*. Excepted from **the definition of *fissile material*** is: (a) *natural uranium* or *depleted uranium* which is unirradiated, and (b) *natural uranium* or *depleted uranium* which has been irradiated in thermal reactors only.
5	222 related consequentia	Consequenti al changes in	Proposed consequential change in para 226 not accepted by Review Panel	

Change	IAEA para	UN para	Existing text in TS-R-1 (2003)	Text Recommended by Review Panel No. 2
	l changes in paras 226, 418, 543, 549, 559, 672, 831, 832, 833 and Table XII	2.7.7.1.7, 5.2.2.1.12.2, 5.4.1.5.7.1, 5.1.5.2.4(d), 6.4.11.2, 6.4.23.12,. 6.4.23.13,. 6.4.23.14, 6.4.11.2	418. *Packages* containing *fissile material* shall not contain: (a) a mass of *fissile material* different from that authorized for the *package design*, (b) any radionuclide **or *fissile material*** different from those authorized for the *package design*, or (c) contents in a form or physical or chemical state, or in a spatial arrangement, different from those authorized for the *package design*, as specified in their certificates of approval where appropriate. 543 (b) Activity: The maximum activity of the *radioactive contents* during transport expressed in units of becquerels (Bq) with the appropriate SI prefix (see Annex II). For *fissile material*, the mass of *fissile material* in units of grams (g), or multiples thereof, may be used in place of activity. 549 (f) The maximum activity of the *radioactive contents* during transport expressed in units of becquerels (Bq) with an appropriate SI prefix (see Annex II). For *fissile material*, the mass of *fissile material* in units of grams (g), or appropriate multiples thereof, may be used in place of activity; 559 (e) The maximum activity of the *radioactive contents* during transport expressed in units of becquerels (Bq) with an appropriate SI prefix (see Annex II). For *fissile material*, the mass of *fissile material* in units of grams (g), or multiples thereof, may be used in place of activity.	418. *Packages* containing *fissile material* shall not contain: (a) **quantities** of *fissile material* **and/or fissile nuclides not** authorized for the *package design*, (b) any radionuclide different from those authorized for the *package design*, or (c) contents in a form or physical or chemical state, or in a spatial arrangement, different from those authorized for the *package design*, as specified in their certificates of approval where appropriate. 543 (b) Activity: The maximum activity of the *radioactive contents* during transport expressed in units of becquerels (Bq) with the appropriate SI prefix (see Annex II). For *fissile material*, the mass of ***fissile nuclides*** in units of grams (g), or multiples thereof, may be used in place of activity. 549 (f) The maximum activity of the *radioactive contents* during transport expressed in units of becquerels (Bq) with an appropriate SI prefix (see Annex II). For *fissile material*, the mass of ***fissile nuclides*** in units of grams (g), or multiples thereof, may be used in place of activity; 559 (e) The maximum activity of the *radioactive contents* during transport expressed in units of becquerels (Bq) with an appropriate SI prefix (see Annex II). For *fissile material*, the mass of ***fissile nuclides*** in units of grams (g), or multiples thereof, may be used in place of activity. 672 (a) in formula,

Change	IAEA para	UN para	Existing text in TS-R-1 (2003)	Text Recommended by Review Panel No. 2
			672 (a) in formula, *mass of other fissile material(g)* 672 (a) (i) each individual *package* contains not more than 15 g of *fissile material*; for unpackaged material, this quantity limitation shall apply to the *consignment* being carried in or on the *conveyance*, or (ii) the *fissile material* is a homogeneous hydrogenous solution or mixture where the ratio of fissile nuclides to hydrogen is less than 5% by mass, or (iii) there is not more than 5 g of *fissile material* in any 10 litre volume of material. 672 (b) Uranium 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 *fissile material* is 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. TABLE XII See appendix 1 831 (j) A specification of the authorized *radioactive contents*, including any restrictions on the *radioactive contents* which might not be obvious from the nature of the *packaging*. This shall include the physical and chemical forms, the activities involved (including	*mass of other fissile **nuclides**(g)* 672 (a) (i) each individual *package* contains not more than 15 g of *fissile **nuclides***; for unpackaged material, this quantity limitation shall apply to the *consignment* being carried in or on the *conveyance*, or (ii) the *fissile material* is a homogeneous hydrogenous solution or mixture where the ratio of fissile nuclides to hydrogen is less than 5% by mass, or (iii) there is not more than 5 g of *fissile **nuclides*** in any 10 litre volume of material. 672 (b) Uranium 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 *fissile **nuclides*** **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. TABLE XII See appendix 1 831 (j) A specification of the authorized *radioactive contents*, including any restrictions on the *radioactive contents* which might not be obvious from the nature of the *packaging*. This shall include the physical and chemical forms, the activities involved (including those

Change	IAEA para	UN para	Existing text in TS-R-1 (2003)	Text Recommended by Review Panel No. 2
			those of the various isotopes, if appropriate), amounts in grams (for *fissile material*), and whether *special form radioactive material* or *low dispersible radioactive material*, if applicable. 832 (j) A specification of the actual *radioactive contents*, including any restrictions on the *radioactive contents* which might not be obvious from the nature of the *packaging*. This shall include the physical and chemical forms, the total activities involved (including those of the various isotopes, if appropriate), amounts in grams (for *fissile material*), and whether *special form radioactive material* or *low dispersible radioactive material*, if applicable . 833 (l) A specification of the authorized *radioactive content*, including any restrictions on the *radioactive contents* which might not be obvious from the nature of the *packaging*. This shall include the physical and chemical forms, the activities involved (including those of the various isotopes, if appropriate), amounts in grams (for *fissile material*), and whether *special form radioactive material* or *low dispersible radioactive material*, if applicable.	of the various isotopes, if appropriate), amounts in grams (for *fissile material* **and/or *fissile nuclides***), and whether *special form radioactive material* or *low dispersible radioactive material*, if applicable. 832 (j) A specification of the actual *radioactive contents*, including any restrictions on the *radioactive contents* which might not be obvious from the nature of the *packaging*. This shall include the physical and chemical forms, the total activities involved (including those of the various isotopes, if appropriate), amounts in grams (for *fissile material* **and/or *fissile nuclides***), and whether *special form radioactive material* or *low dispersible radioactive material*, if applicable . 833 (l) A specification of the authorized *radioactive content*, including any restrictions on the *radioactive contents* which might not be obvious from the nature of the *packaging*. This shall include the physical and chemical forms, the activities involved (including those of the various isotopes, if appropriate), amounts in grams (for *fissile material* **and/or *fissile nuclides***), and whether *special form radioactive material* or *low dispersible radioactive material*, if applicable.
10	303	1.1.2.2.4	303. Workers shall receive appropriate training concerning the radiation hazards involved and the precautions to be observed in order to ensure restriction of their exposure and that of other persons who might be affected by their actions.	303. Workers shall receive appropriate training concerning **radiation protection** and the precautions to be observed in order to **control their occupational exposure and the exposure** of other persons who might be affected by their actions.
11	305	1.1.2.2.5	305. For occupational exposures arising from transport activities, where it is assessed that the effective dose: **(a) is most unlikely to exceed 1 mSv in a year, neither**	305. For occupational exposures arising from transport activities, where it is assessed that the effective dose: (a) is likely to be between 1 and 6 mSv in a year, a dose

Change	IAEA para	UN para	Existing text in TS-R-1 (2003)	Text Recommended by Review Panel No. 2
			special work patterns nor detailed monitoring nor dose assessment programmes nor individual record keeping shall be required; (b) is likely to be between 1 and 6 mSv in a year, a dose assessment programme via work place monitoring or individual monitoring shall be conducted; (c) is likely to exceed 6 mSv in a year, individual monitoring shall be conducted. When individual monitoring or work place monitoring is conducted, appropriate records shall be kept.	assessment programme via work place monitoring or individual monitoring shall be conducted; (**b**) is likely to exceed 6 mSv in a year, individual monitoring shall be conducted. When individual monitoring or work place monitoring is conducted, appropriate records shall be kept.
12	Table I footnote (a)	Table 2.7.7.2.1	(a) A_1 and/or A_2 values for these parent radionuclides include contributions from daughter radionuclides with half-lives less than 10 days.	(a) A_1 and/or A_2 values for these parent radionuclides include contributions from daughter radionuclides with half-lives less than 10 days, **as listed in the following:** **Mg 28 Al 28** **Ar 42 K 42** **Ca 47 Sc 47** **Ti 44 Sc 44** **Fe 52 Mn 52m** **Fe 60 Co 60m** **Zn 69m Zn 69** **Ge 68 Ga 68** **Rb 83 Kr 83m** **Sr 82 Rb 82** **Sr 90 Y 90** **Sr 91 Y 91m** **Sr 92 Y 92** **Y 87 Sr 87m** **Zr 95 Nb 95m** **Zr 97 Nb 97m, Nb 97** **Mo 99 Tc 99m** **Tc 95m Tc 95** **Tc 96m Tc 96** **Ru 103 Rh 103m** **Ru 106 Rh 106** **Pd 103 Rh 103m** **Ag 108m Ag 108** **Ag 110m Ag 110** **Cd 115 In 115m** **In 114m In 114**

Change	IAEA para	UN para	Existing text in TS-R-1 (2003)	Text Recommended by Review Panel No. 2
				Sn 113 In 113m **Sn 121m Sn 121** **Sn 126 Sb 126m** **Te 118 Sb 118** **Te 127m Te 127** **Te 129m Te 129** **Te 131m Te 131** **Te 132 I 132** **I 135 Xe 135m** **Xe 122 I 122** **Cs 137 Ba 137m** **Ba 131 Cs 131** **Ba 140 La 140** **Ce 144 Pr 144m, Pr 144** **Pm 148m Pm 148** **Gd 146 Eu 146** **Dy 166 Ho 166** **Hf 172 Lu 172** **W 178 Ta 178** **W 188 Re 188** **Re 189 Os 189m** **Os 194 Ir 194** **Ir 189 Os 189m** **Pt 188 Ir 188** **Hg 194 Au 194** **Hg 195m Hg 195** **Pb 210 Bi 210** **Pb 212 Bi 212, Tl 208, Po 212** **Bi 210m Tl 206** **Bi 212 Tl 208, Po 212** **At 211 Po 211** **Rn 222 Po 218, Pb 214, At 218, Bi 214, Po 214** **Ra 223 Rn 219, Po 215, Pb 211, Bi 211, Po 211, Tl 207** **Ra 224 Rn 220, Po 216, Pb 212, Bi 212, Tl 208, Po 212** **Ra 225 Ac 225, Fr 221, At 217, Bi 213, Tl 209, Po 213, Pb 209** **Ra 226 Rn 222, Po 218, Pb 214, At 218, Bi 214, Po 214** **Ra 228 Ac 228** **Ac 225 Fr 221, At 217, Bi 213, Tl 209, Po 213, Pb 209** **Ac 227 Fr 223** **Th 228 Ra 224, Rn 220, Po 216, Pb 212, Bi 212, Tl 208, Po 212** **Th 234 Pa 234m, Pa 234** **Pa 230 Ac 226, Th 226, Fr 222, Ra 222, Rn 218, Po 214** **U 230 Th 226, Ra 222, Rn 218, Po 214** **U 235 Th 231**

Change	IAEA para	UN para	Existing text in TS-R-1 (2003)	Text Recommended by Review Panel No. 2
				Pu 241 U 237 **Pu 244 U 240, Np 240m** **Am 242m Am 242, Np 238** **Am 243 Np 239** **Cm 247 Pu 243** **Bk 249 Am 245** **Cf 253 Cm 249**
13	Table I footnote (b)	Table 2.7.7.2.1	(b) Parent nuclides and their progeny included in secular equilibrium are listed in the following: Sr-90 Y-90 Zr-93 Nb-93m Zr-97 Nb-97 Ru-106 Rh-106 Cs-137 Ba-137m **Ce-134 La-134** Ce-144 Pr-144 Ba-140 La-140 Bi-212 Tl-208 (0.36), Po-212 (0.64) Pb-210 Bi-210, Po-210 Pb-212 Bi-212, Tl-208 (0.36), Po-212 (0.64) **Rn-220 Po-216** Rn-222 Po-218, Pb-214, Bi-214, Po-214 Ra-223 Rn-219, Po-215, Pb-211, Bi-211, Tl-207 Ra-224 Rn-220, Po-216, Pb-212, Bi-212, Tl-208 (0.36), Po-212 (0.64) Ra-226 Rn-222, Po-218, Pb-214, Bi-214, Po-214, Pb-210, Bi-210, Po-210 Ra-228 Ac-228 **Th-226 Ra-222, Rn-218, Po-214** Th-228 Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208 (0.36), Po-212 (0.64) Th-229 Ra-225, Ac-225, Fr-221, At-217, Bi-213, Po-213, Pb-209 Th-nat Ra-228, Ac-228, Th-228, Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208 (0.36), Po-212 (0.64) Th-234 Pa-234m U-230 Th-226, Ra-222, Rn-218, Po-214 U-232 Th-228, Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208 (0.36), Po-212 (0.64)	(b) Parent nuclides and their progeny included in secular equilibrium are listed in the following: Sr-90 Y-90 Zr-93 Nb-93m Zr-97 Nb-97 Ru-106 Rh-106 **Ag-108m Ag-108** Cs-137 Ba-137m Ce-144 Pr-144 Ba-140 La-140 Bi-212 Tl-208 (0.36), Po-212 (0.64) Pb-210 Bi-210, Po-210 Pb-212 Bi-212, Tl-208 (0.36), Po-212 (0.64) Rn-222 Po-218, Pb-214, Bi-214, Po-214 Ra-223 Rn-219, Po-215, Pb-211, Bi-211, Tl-207 Ra-224 Rn-220, Po-216, Pb-212, Bi-212, Tl-208 (0.36), Po-212 (0.64) Ra-226 Rn-222, Po-218, Pb-214, Bi-214, Po-214, Pb-210, Bi-210, Po-210 Ra-228 Ac-228 Th-228 Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208 (0.36), Po-212 (0.64) Th-229 Ra-225, Ac-225, Fr-221, At-217, Bi-213, Po-213, Pb-209 Th-nat Ra-228, Ac-228, Th-228, Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208 (0.36), Po-212 (0.64) Th-234 Pa-234m U-230 Th-226, Ra-222, Rn-218, Po-214 U-232 Th-228, Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208 (0.36), Po-212 (0.64) U-235 Th-231 U-238 Th-234, Pa-234m

Change	IAEA para	UN para	Existing text in TS-R-1 (2003)	Text Recommended by Review Panel No. 2
			U-235 Th-231 U-238 Th-234, Pa-234m U-nat Th-234, Pa-234m, U-234, Th-230, Ra-226, Rn-222, Po-218, Pb-214, Bi-214, Po-214, Pb-210, Bi-210, Po-210 **U-240 Np-240m** Np-237 Pa-233 Am-242m Am-242 Am-243 Np-239	U-nat Th-234, Pa-234m, U-234, Th-230, Ra-226, Rn-222, Po-218, Pb-214, Bi-214, Po-214, Pb-210, Bi-210, Po-210 Np-237 Pa-233 Am-242m Am-242 Am-243 Np-239
14	402	2.7.7.2.2	402. For individual radionuclides which are not listed in Table I the determination of the basic radionuclide values referred to in para. 401 shall require ***competent authority*** **approval or, for international transport,** *multilateral approval*. **Where the chemical form of each radionuclide is known,** it is permissible to use the A_2 value related to its solubility class as recommended by the International Commission on Radiological Protection, if the chemical forms under both normal and accident conditions of transport are taken into consideration. Alternatively, the radionuclide values in Table II may be used without obtaining *competent authority* approval.	402. For individual radionuclides which are not listed in Table I the determination of the basic radionuclide values referred to in para. 401 shall require *multilateral approval*. It is permissible to use **an** A_2 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 II may be used without obtaining *competent authority* approval.
15	TABLE II	Table 2.7.7.2.2	TABLE II (first column) *RADIOACTIVE CONTENTS* Only beta or gamma emitting nuclides are known to be present **Only** alpha emitting nuclides are known to be	TABLE II (first column) *RADIOACTIVE CONTENTS* Only beta or gamma emitting nuclides are known to be present. Alpha emitting nuclides**, but no neutron emitters** are known

Change	IAEA para	UN para	Existing text in TS-R-1 (2003)	Text Recommended by Review Panel No. 2
			present No relevant data are available	to be present **Neutron emitting nuclides are known to be present or** no relevant data are available
17	419	2.7.7.1.8	419. The mass of uranium hexafluoride in a *package* shall not exceed a value that would lead to an ullage smaller than 5% at the maximum temperature of the *package* as specified for the plant systems where the *package* shall be used. The uranium hexafluoride shall be in solid form and the internal pressure of the *package* shall be below atmospheric pressure when presented for transport.	**419. Packages containing uranium hexafluoride shall not contain:_** **(a) a mass of uranium hexafluoride different from that authorized for the package design,** **(b) a mass of uranium hexafluoride greater than a value that would lead to an ullage smaller than 5% at the maximum temperature of the package as specified for the plant systems where the package shall be used, or** **(c) uranium hexafluoride other than in solid form or at an internal pressure above atmospheric pressure when presented for transport.**
18	502	5.1.5.1.2	502. Before each *shipment* of any *package*, the following requirements shall be fulfilled: (a) For any *package* it shall be ensured that all the requirements specified in the relevant provisions of these Regulations have been satisfied. (b) It shall be ensured that lifting attachments which do not meet the requirements of para. 607 have been removed or otherwise rendered incapable of being used for lifting the *package*, in accordance with para. 608. (c) For each *Type B(U)*, *Type B(M)* and *Type C package* and for each *package* containing *fissile material*, it shall be ensured that all the requirements - specified in the approval certificates have been satisfied. (d) Each *Type B(U)*, *Type B(M)* and *Type C package* shall be held until equilibrium conditions	502. Before each *shipment* of any *package*, the following requirements shall be fulfilled: (a) For any *package* it shall be ensured that all the requirements specified in the relevant provisions of these Regulations have been satisfied. (b) It shall be ensured that lifting attachments which do not meet the requirements of para. 607 have been removed or otherwise rendered incapable of being used for lifting the *package*, in accordance with para. 608. (c) **For each package requiring competent authority approval**, it shall be ensured that all the requirements specified in the approval certificates have been satisfied. (d) Each *Type B(U)*, *Type B(M)* and *Type C package* shall

Change	IAEA para	UN para	Existing text in TS-R-1 (2003)	Text Recommended by Review Panel No. 2
			have been approached closely enough to demonstrate compliance with the requirements for temperature and pressure unless an exemption from these requirements has received *unilateral approval*. (e) For each *Type B(U)*, *Type B(M)* and *Type C package*, it shall be ensured by inspection and/or appropriate tests that all closures, valve and other openings of the *containment system* through which the *radioactive contents* might escape are properly closed and, where appropriate, sealed in the manner for which the demonstrations of compliance with the requirements of paras 656 and 669 were made. (f) For each *special form radioactive material*, it shall be ensured that all the requirements specified in the approval certificate and the relevant provisions of these Regulations have been satisfied. (g) For *packages* containing *fissile material* the measurement specified in para. 674(b) and the tests to demonstrate closure of each *package* as specified in para. 677 shall be performed where applicable. (h) For each *low dispersible radioactive material*, it shall be ensured that all the requirements specified in the approval certificate and the relevant provisions of these Regulations have been satisfied.	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 *unilateral approval*. (e) For each *Type B(U)*, *Type B(M)* and *Type C package*, it shall be ensured by inspection and/or appropriate tests that all closures, valve and other openings of the *containment system* through which the *radioactive contents* might escape are properly closed and, where appropriate, sealed in the manner for which the demonstrations of compliance with the requirements of paras 656 and 669 were made. (f) For each *special form radioactive material*, it shall be ensured that all the requirements specified in the approval certificate and the relevant provisions of these Regulations have been satisfied. (g) For *packages* containing *fissile material* the measurement specified in para. 674(b) and the tests to demonstrate closure of each *package* as specified in para. 677 shall be performed where applicable. (h) For each *low dispersible radioactive material*, it shall be ensured that all the requirements specified in the approval certificate and the relevant provisions of these Regulations have been satisfied.
19	503	4.1.9.1.3	503. A *package* shall not contain any other items **except such articles and documents as are necessary for the use of the *radioactive material*. This requirement shall not preclude the transport of *low specific activity material* or *surface contaminated objects* with other items. The transport of such articles and documents in a *package*, or of *low specific activity material* or *surface contaminated objects* with other items may be permitted provided that** there is no interaction between them and the *packaging* or its *radioactive contents* that would reduce the safety of the *package*.	503. **A package may only contain other items that are necessary for the use of the radioactive material. The interaction between these other items and the package, under the conditions of transport applicable to the design, shall not reduce the safety of the package.**

Change	IAEA para	UN para	Existing text in TS-R-1 (2003)	Text Recommended by Review Panel No. 2
20	Table VIII footnote "c"	Included in Part 3	Table VIII footnote "c" [c] UN 2977 and UN 2978 are special cases without a unique relationship with the Schedules.	Table VIII footnote "c" [c] **In the case of non-fissile or fissile excepted uranium hexafluoride, the UN 2978 and the proper shipping name and description, "RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, non-fissile or fissile excepted," takes precedence over other UN numbers applicable to non-fissile and fissile excepted. In the case of uranium hexafluoride that is fissile material the UN 2977 and the proper shipping name, "RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, FISSILE," takes precedence over other UN numbers applicable to fissile material.**
22	537	5.2.1.5.4	537. Each *package* which conforms to: (a) an *IP-1*, an *IP-2* or an *IP-3 design* shall be legibly and durably marked on the outside of the *packaging* with "TYPE IP-1", "TYPE IP-2" or "TYPE IP-3" as appropriate; (b) a *Type A package design* shall be legibly and durably marked on the outside of the *packaging* with "TYPE A"; (c) an *IP-2*, an *IP-3* or a *Type A package design* shall be legibly and durably marked on the outside of the *packaging* with the international *vehicle* registration code (VRI Code) of the country of origin of *design* and the name of the manufacturers, or other identification of the *packaging* specified by the *competent authority*.	537. Each *package* which conforms to: (a) an *IP-1*, an *IP-2* or an *IP-3 design* shall be legibly and durably marked on the outside of the *packaging* with "TYPE IP-1", "TYPE IP-2" or "TYPE IP-3" as appropriate; (b) a *Type A package design* shall be legibly and durably marked on the outside of the *packaging* with "TYPE A"; (c) an *IP-2*, an *IP-3* or a *Type A package design* shall be legibly and durably marked on the outside of the *packaging* with the international *vehicle* registration code (VRI Code) of the country of origin of *design* and **either** the name of the **manufacturer** or other identification of the *packaging* specified by the *competent authority* **of the country of origin of *design*.**
23	566	7.1.7.3.3	566. Loading of *freight containers* and accumulation of *packages*, *overpacks* and *freight containers* shall be controlled as follows:	566. Loading of *freight containers* and accumulation of *packages*, *overpacks* and *freight containers* shall be controlled as follows:

Change	IAEA para	UN para	Existing text in TS-R-1 (2003)	Text Recommended by Review Panel No. 2
			(a) Except under the condition of *exclusive use*, the total number of *packages*, *overpacks* and *freight containers* aboard a single *conveyance* shall be so limited that the total sum of the *transport indexes* aboard the *conveyance* does not exceed the values shown in Table IX. **For *consignments* of *LSA-I material* there shall be no limit on the sum of the *transport indexes*.** **(b) Where a *consignment* is transported under *exclusive use*, there shall be no limit on the sum of the *transport indexes* aboard a single *conveyance*.** (c) The *radiation level* under routine conditions of transport shall not exceed 2 mSv/h at any point on, and 0.1 mSv/h at 2 m from, the external surface of the *conveyance*, except for *consignments* transported under *exclusive use* by road or rail, for which the radiation limits around the *vehicle* are set forth in para 572(b) and (c). (d) The total sum of the *criticality safety indexes* in a *freight container* and aboard a *conveyance* shall not exceed the values shown in Table X.	(a) Except under the condition of *exclusive use*, **and for consignments of LSA-I material,** the total number of *packages*, *overpacks* and *freight containers* aboard a single *conveyance* shall be so limited that the total sum of the *transport indexes* aboard the *conveyance* does not exceed the values shown in Table IX. (**b**) The *radiation level* under routine conditions of transport shall not exceed 2 mSv/h at any point on, and 0.1 mSv/h at 2 m from, the external surface of the *conveyance*, except for *consignments* transported under *exclusive use* by road or rail, for which the radiation limits around the *vehicle* are set forth in para 572(b) and (c). (**c**) The total sum of the *criticality safety indexes* in a *freight container* and aboard a *conveyance* shall not exceed the values shown in Table X.
24	622 and consequential changes in 624, 625, 627, 628 and 646b	6.4.5.2 and consequential changes in 6.4.5.4.1 6.4.5.4.2 6.4.5.4.4 6.4.5.4.5 6.4.7.14	622. A *package*, to be qualified as a *Type IP-2*, shall be designed to meet the requirements for *Type IP-1* as specified in para. 621 and, in addition, if it were subjected to the tests specified in paras 722 and 723, it would - prevent: (a) loss or dispersal of the *radioactive contents*; and (b) **loss of shielding integrity which would result in** more than a 20% increase in the *radiation level* at any external surface of the *package*.	622. A *package*, to be qualified as a *Type IP-2*, shall be designed to meet the requirements for *Type IP-1* as specified in para. 621 and, in addition, if it were subjected to the tests specified in paras 722 and 723, it would prevent: (a) loss or dispersal of the *radioactive contents*; and (b) more than a 20% increase in the **maximum** *radiation level* at any external surface of the *package.*
26	652 and 662	6.4.8.3 and 6.4.8.13	652. **Except as required in para. 617 for a *package* transported by air**, a *package* shall be so designed that,	652. A *package* shall be so designed that, under the ambient condition specified in para. 653 **and in the absence of**

Change	IAEA para	UN para	Existing text in TS-R-1 (2003)	Text Recommended by Review Panel No. 2
			under the ambient condition specified in para. 653, the - temperature of the accessible surfaces of a *package* shall not exceed 50°C, unless the *package* is transported under *exclusive use*. 662. Except as required in para. 617 for a *package* transported by air, the maximum temperature of any surface readily accessible during transport of a *package* shall not exceed 85°C in the absence of insolation under the ambient conditions specified in para. 653. **The *package* shall be carried under *exclusive use*, as specified in para. 652, if this maximum temperature exceeds 50°C.** Account may be taken of barriers or screens intended to give protection to persons without the need for the barriers or screens being subject to any test.	**insolation**, the temperature of the accessible surfaces of a *package* shall not exceed 50 °C, unless the package is transported under *exclusive use*. 652 bis. Except as required in para. 617 for a *package* transported by air, the maximum temperature of any surface readily accessible during transport of a *package* **under exclusive use** shall not exceed 85°C in the absence of insolation under the ambient conditions specified in para. 653. Account may be taken of barriers or screens intended to give protection to persons without the need for the barriers or screens being subject to any test. 662 : deleted and replaced with 652bis as above
27	418 and 672 NOTE. In original proposal: Current para 672, as modified, becomes new para 417bis	2.7.7.1.7	418. *Packages* containing *fissile material* shall not contain: (a) a mass of *fissile material* different from that authorized for the *package design*, (b) any radionuclide or *fissile material* different from those authorized for the *package design*, or (c) contents in a form or physical or chemical state, or in a spatial arrangement, different from those authorized for the *package design*, as specified in their certificates of approval where appropriate.	418. **Unless excepted by para. 672** *packages* containing *fissile material* shall not contain: (a) a mass of *fissile material* different from that authorized for the *package design*, (b) any radionuclide or *fissile material* different from those authorized for the *package design*, or (c) contents in a form or physical or chemical state, or in a spatial arrangement, different from those authorized for the *package design*, as specified in their certificates of approval where appropriate. 672. **no change**
31	672	6.4.11.2	672 …… (a)……. …..(iii) there is not more than 5 g of *fissile material* in any 10 litre volume of material. Neither beryllium nor deuterium **in hydrogenous**	672 …… (a)……. …..(iii) there is not more than 5 g of *fissile material* in any 10 litre volume of material.

Change	IAEA para	UN para	Existing text in TS-R-1 (2003)	Text Recommended by Review Panel No. 2
			material enriched in deuterium shall be present in quantities exceeding 1% of the applicable consignment mass limits provided in Table XII. (b)Uranium enriched…..	Neither beryllium nor deuterium shall be present in quantities exceeding 1% of the applicable consignment mass limits provided in Table XII**, except for deuterium in natural concentration in hydrogen.**. (b)Uranium enriched…..
32	672	6.4.11.2	672. *Fissile material* meeting one of the provisions (a)–(d) of this paragraph is excepted from the requirement to be transported in *packages* that comply with paras 673–682 as well as the other requirements of these Regulations that apply to *fissile material*. Only one type of exception is allowed per *consignment*. (a) A mass limit per *consignment* such that: $\frac{\text{mass of uranium-235 (g)}}{X} + \frac{\text{mass of other fissile material (g)}}{Y} < 1$ where X and Y are the mass limits defined in Table XII, provided that either: (i) each individual *package* contains not more than 15 g of *fissile material*; for unpackaged material, this quantity limitation shall apply to the - *consignment* being carried in or on the *conveyance*, or …… ……or any combination of those radionuclides.	672. *Fissile material* meeting one of the provisions (a)–(d) of this paragraph is excepted from the requirement to be transported in *packages* that comply with paras 673–682 as well as the other requirements of these Regulations that apply to *fissile material*. Only one type of exception is allowed per *consignment*. (a) A mass limit per *consignment* such that: $\frac{\text{mass of uranium-235 (g)}}{X} + \frac{\text{mass of other fissile material (g)}}{Y} < 1$ where X and Y are the mass limits defined in Table XII, provided **that the smallest external dimension of each package is not less than 10 cm and** that either: (i) each individual *package* contains not more than 15 g of *fissile material*; for unpackaged material, this quantity limitation shall apply to the - *consignment* being carried in or on the *conveyance*, or …… ……or any combination of those radionuclides.
38	677	6.4.11.7	677. For a *package* in isolation, it shall be assumed that water can leak into or out of all void spaces of the *package*, including those within the *containment system*. However, if the *design* incorporates special features to prevent such leakage of water into or out of certain void spaces, even as a result of error, absence of leakage may be assumed in respect of those void spaces. Special features shall include	677. For a *package* in isolation, it shall be assumed that water can leak into or out of all void spaces of the *package*, including those within the *containment system*. However, if the *design* incorporates special features to prevent such leakage of water into or out of certain void spaces, even as a result of error, absence of leakage may be assumed in respect of those void spaces. Special features shall include the

Change	IAEA para	UN para	Existing text in TS-R-1 (2003)	Text Recommended by Review Panel No. 2
			the following: (a) Multiple high standard water barriers, each of which would remain watertight if the *package* were subject to the tests prescribed in para. 682(b), a high degree of quality control in the manufacture, maintenance and repair of *packagings* and tests to demonstrate the closure of each *package* before each *shipment*; or (b) For *packages* containing uranium hexafluoride only: (i) *packages* where, following the tests prescribed in para. 682(b), there is no physical contact between the valve and any other component of the *packaging* other than at its original point of attachment and where, in addition, following the test prescribed in para. 728 the valves remain leaktight; and (ii) a high degree of quality control in the manufacture, maintenance and repair of *packagings* coupled with tests to demonstrate closure of each *package* before each *shipment*.	following: (a) Multiple high standard water barriers, each of which would remain watertight if the *package* were subject to the tests prescribed in para. 682(b), a high degree of quality control in the manufacture, maintenance and repair of *packagings* and tests to demonstrate the closure of each *package* before each *shipment*; or (b) For *packages* containing uranium hexafluoride, **with maximum uranium enrichment of 5 mass percent uranium-235:** (i) *packages* where, following the tests prescribed in para. 682(b), there is no physical contact between the valve and any other component of the *packaging* other than at its original point of attachment and where, in addition, following the test prescribed in para. 728 the valves remain leaktight; and (ii) a high degree of quality control in the manufacture, maintenance and repair of *packagings* coupled with tests to demonstrate closure of each *package* before each *shipment.*
39	709	2.7.4.6	709. Specimens that comprise or simulate *radioactive material* enclosed in a sealed capsule may be excepted from: (a) The tests prescribed in paras 705 and 706 provided the mass of the *special form radioactive material* is less than 200 g and they are alternatively subjected to the Class 4 impact test prescribed in the International Organization for Standardization document ISO 2919: "Sealed Radioactive Sources — Classification" [11], and	709. Specimens that comprise or simulate *radioactive material* enclosed in a sealed capsule may be excepted from: (a) The tests prescribed in paras 705 and 706 provided the mass of the *special form radioactive material* i) is less than 200 g and they are alternately subjected to the Class 4 impact test prescribed in the International Organization for

Change	IAEA para	UN para	Existing text in TS-R-1 (2003)	Text Recommended by Review Panel No. 2
			Classification" [11], and (b) The test prescribed in para. 708 provided they are alternatively subjected to the Class 6 temperature test specified in the International Organization for Standardization document ISO 2919: "Sealed Radioactive Sources —Classification" [11].	Standardization document ISO 2919: "Sealed Radioactive Sources – Classification" [11], or ii) **is less than 500 g and they are alternately subjected to the Class 5 impact test prescribed in the International Organization for Standardization document ISO 2919: "Sealed Radioactive Sources – Classification" [11], and** (b) The test prescribed in para. 708 provided they are alternatively subjected to the Class 6 temperature test specified in the International Organization for Standardization document ISO 2919: "Sealed Radioactive Sources — Classification" [11].
42	805	6.4.22.1	805. The approval of *designs* for *packages* containing 0.1 kg or more of uranium hexafluoride requires that: (a) **After 31 December 2000**, each *design* that meets the requirements of para. 632 shall require *multilateral approval*. **After 31 December 2003**, each *design* that meets the requirements of paras 629–631 shall require *unilateral approval* by the *competent authority* of the country of origin of the *design*; (b) The application for approval shall include all information necessary to satisfy the *competent authority* that the *design* meets the requirements of para. 629, and a specification of the applicable *quality assurance* programme as required in para. 310;	805. The approval of *designs* for *packages* containing 0.1 kg or more of uranium hexafluoride requires that: **(a) Each design that meets the requirements of para. 632 shall require multilateral approval.** (a bis) **Each design that meets the requirement of paras 629-631 shall require unilateral approval by the competent authority of the country of origin of the design,** unless multilateral approval is otherwise required by these regulations. (b) The application for approval shall include all information necessary to satisfy the *competent authority* that the *design* meets the requirements of para. 629, and a specification of the applicable *quality assurance* programme as required in para. 310;

Change	IAEA para	UN para	Existing text in TS-R-1 (2003)	Text Recommended by Review Panel No. 2
			assurance programme as required in para. 310; (c) The *competent authority* shall establish an approval certificate stating that the approved *design* meets the requirements of para. 629 and shall attribute to that *design* an identification mark.	(c) The *competent authority* shall establish an approval certificate stating that the approved *design* meets the requirements of para. 629 and shall attribute to that *design* an identification mark.
47	814bis	Suggest new text for 5.1.5.3.1 and 6.4.23	The proposal involves new text, complete with heading, (currently missing from the regulations) to be incorporated between existing paras 814 and 815	**APPROVAL OF RADIONUCLIDE VALUES** **814bis. Each calculation of radionuclide values that are not listed in Table I shall require *multilateral approval.*** **814bis+1. An application for approval shall include:** **(a) The effective dose rate coefficient to the skin for external dose due to photons calculated at 1m;** **(b) the equivalent dose rate coefficient for external dose due to beta emission calculated at 1m;** **(c) the effective dose coefficient for the inhalation of a 1 µm AMAD aerosol of the radionuclide by workers, in the most restrictive lung absorption category;** **(d) the equivalent dose coefficient to the skin for skin contamination;** **(e) if the radionuclide is a noble gas, the effective dose coefficient or the equivalent dose coefficient to the skin for submersion dose; and** **(f) the calculated values for A1 and A2 in TBq, the activity concentration for exempt material in Bq/g; and the activity limits for exempt *consignments* in Bq.** **814bis+2. The *competent authority* shall establish an approval stating that the calculated radionuclide values are approved.** 827 …*shipment, package design* **and unlisted radionuclide values.**
49	817	6.4.24.3	817. *Packagings* manufactured to a *package design* approved by the *competent authority* under the provisions	817. *Packagings* manufactured to a *package design* approved by the *competent authority* under the provisions of

Change	IAEA para	UN para	Existing text in TS-R-1 (2003)	Text Recommended by Review Panel No. 2
			of the 1985 or 1985 (As Amended 1990) Editions of these Regulations may continue to be used **until 31 December 2003,** subject to: the mandatory programme of *quality assurance* in accordance with the requirements of para. 310; the activity limits and material restrictions of Section IV; and, for a *package* containing *fissile material* and transported by air, the requirement of para. 680. **After this date use may continue subject, additionally, to *multilateral approval* of *package design*.** Changes in the *design* of the *packaging* or in the nature or quantity of the authorized *radioactive contents* which, as determined by the *competent authority*, would significantly affect safety shall require that this Edition of the Regulations be met in full. All *packagings* for which manufacture begins after 31 December 2006 shall meet this Edition of the Regulations in full.	the 1985 or 1985 (As Amended 1990) Editions of these Regulations may continue to be used, subject to: **multilateral approval of package design,** the mandatory programme of *quality assurance* in accordance with the requirements of para. 310; the activity limits and material restrictions of Section IV; and, for a *package* containing *fissile material* and transported by air, the requirement of para. 680. Changes in the *design* of the *packaging* or in the nature or quantity of the authorized *radioactive contents* which, as determined by the *competent authority*, would significantly affect safety shall require that this Edition of the Regulations be met in full. All *packagings* for which manufacture begins after 31 December 2006 shall meet this Edition of the Regulations in full.
52	819	6.4.23.15	819. The *competent authority* shall be informed of the serial number of each *packaging* manufactured to a *design* approved under paras 806, 809, 812, and 816–817. **The *competent authority* should, consistent with para. 311, maintain a register of such serial numbers.**	819. The *competent authority* shall be informed of the serial number of each *packaging* manufactured to a *design* approved under paras 806, 809, 812, and 816–817
54	820	5.1.5.2.2	820. *Multilateral approval* shall be required for: (a) the *shipment* of *Type B(M) packages* not conforming with the requirements of para. 637 or designed to allow controlled intermittent venting; (b) the *shipment* of *Type B(M) packages* containing *radioactive material* with an activity greater than 3000 A_1 or 3000 A_2, as appropriate, or 1000 TBq, whichever is the lower; (c) the *shipment* of *packages* containing *fissile materials* if the sum of the *criticality safety indexes* of the	820. *Multilateral approval* shall be required for: (a) the *shipment* of *Type B(M) packages* not conforming with the requirements of para. 637 or designed to allow controlled intermittent venting; (b) the *shipment* of *Type B(M) packages* containing *radioactive material* with an activity greater than 3000 A_1 or 3000 A_2, as appropriate, or 1000 TBq, whichever is the lower; (c) the *shipment* of *packages* containing *fissile materials* if the sum of the *criticality safety indexes* of the *packages*

Change	IAEA para	UN para	Existing text in TS-R-1 (2003)	Text Recommended by Review Panel No. 2
			packages exceeds 50; and (d) *radiation protection programmes* for *shipments* by special use *vessels* according to para. 575(a).	**in a single freight container or in a single conveyance** exceeds 50. **Excluded from this requirement shall be shipments by seagoing vessels, if the sum of the criticality safety indexes does not exceed 50 for any hold, compartment or defined deck area and the distance of 6m between groups of packages or overpacks as required in table X is met**; and (d) *radiation protection programmes* for *shipments* by special use *vessels* according to para. 575(a).
55	824	1.1.2.4.2	824. Each *consignment* transported **internationally** under *special arrangement* shall require *multilateral approval*.	824. **Each *consignment* transported under *special arrangement* shall require *multilateral approval.***
56	833	6.4.23.14	833. Each approval certificate of the *design* of a *package* issued by a *competent authority* shall include the following information: (a) Type of certificate. (b) The *competent authority* identification mark. (c) The issue date and an expiry date. (d) Any restriction on the modes of transport, if appropriate. (e) List of applicable national and international regulations, including the edition of the IAEA Regulations for the Safe Transport of Radioactive Material under which the *design* is approved. (f) The following statement: "This certificate does not relieve the consignor from compliance with any requirement of the government of any country through or into which the package will be transported." (g) References to certificates for alternative *radioactive*	833. Each approval certificate of the *design* of a *package* issued by a *competent authority* shall include the following information: (a) Type of certificate. (b) The *competent authority* identification mark. (c) The issue date and an expiry date. (d) Any restriction on the modes of transport, if appropriate. (e) List of applicable national and international regulations, including the edition of the IAEA Regulations for the Safe Transport of Radioactive Material under which the *design* is approved. (f) The following statement: "This certificate does not relieve the consignor from compliance with any requirement of the government of any country through or into which the package will be transported." (g) References to certificates for alternative *radioactive*

Change	IAEA para	UN para	Existing text in TS-R-1 (2003)	Text Recommended by Review Panel No. 2
			contents, other *competent authority* validation, or additional technical data or information, as deemed appropriate by the *competent authority*. (h) A statement authorizing *shipment* where *shipment* approval is required under para. 820, if deemed appropriate. (i) Identification of the *packaging*. (j) Description of the *packaging* by a reference to the drawings or specification of the *design*. If deemed appropriate by the *competent authority*, a reproducible illustration, not larger than 21 cm by 30 cm, showing the make-up of the *package* should also be provided, accompanied by a brief description of the *packaging*, including materials of manufacture, gross mass, general outside dimensions and appearance. (k) Specification of the *design* by reference to the drawings. (l) A specification of the authorized *radioactive content*, including any restrictions on the *radioactive contents* which might not be obvious from the nature of the *packaging*. This shall include the physical and chemical forms, the activities involved (including those of the various isotopes, if appropriate), amounts in grams (for *fissile material*), and whether *special form radioactive material* or *low dispersible radioactive material*, if applicable. (m) Additionally, for *packages* containing *fissile material*: (i) a detailed description of the authorized *radioactive contents*; (ii) the value of the *criticality safety index*; (iii) reference to the documentation that demonstrates the criticality safety of the contents; (iv) any special features, on the basis of which the absence of water from certain void spaces has	*contents*, other *competent authority* validation, or additional technical data or information, as deemed appropriate by the *competent authority*. (h) A statement authorizing *shipment* where *shipment* approval is required under para. 820, if deemed appropriate. (i) Identification of the *packaging*. (j) Description of the *packaging* by a reference to the drawings or specification of the *design*. If deemed appropriate by the *competent authority*, a reproducible illustration, not larger than 21 cm by 30 cm, showing the make-up of the *package* should also be provided, accompanied by a brief description of the *packaging*, including materials of manufacture, gross mass, general outside dimensions and appearance. (k) Specification of the *design* by reference to the drawings. (l) A specification of the authorized *radioactive content*, including any restrictions on the *radioactive contents* which might not be obvious from the nature of the *packaging*. This shall include the physical and chemical forms, the activities involved (including those of the various isotopes, if appropriate), amounts in grams (for *fissile material*), and whether *special form radioactive material* or *low dispersible radioactive material*, if applicable. (m) Additionally, for *packages* containing *fissile material*: (i) a detailed description of the authorized *radioactive contents*; (ii) the value of the *criticality safety index*; (iii) reference to the documentation that demonstrates the criticality safety of the contents; (iv) any special features, on the basis of which the absence of water from certain void spaces has been assumed in the criticality assessment;

Change	IAEA para	UN para	Existing text in TS-R-1 (2003)	Text Recommended by Review Panel No. 2
			been assumed in the criticality assessment; (v) any allowance (based on para. 674(b)) for a change in neutron multiplication assumed in the criticality assessment as a result of actual irradiation experience; and (vi) the ambient temperature range for which the *package design* has been approved. (n) For *Type B(M) packages*, a statement specifying those prescriptions of paras 637, 653, 654 and 657–664 with which the *package* does not conform and any amplifying information which may be useful to other *competent authorities*. (o) A detailed listing of any supplementary operational controls required for preparation, loading, carriage, unloading and handling of the *consignment*, including any special stowage provisions for the safe dissipation of heat. (p) Reference to information provided by the applicant relating to the use of the *packaging* or specific actions to be taken prior to *shipment*. (q) A statement regarding the ambient conditions assumed for purposes of *design* if these are not in accordance with those specified in paras 653, 654 and 664, as applicable. (r) A specification of the applicable *quality assurance* programme as required in para. 310. (s) Any emergency arrangements deemed necessary by the *competent authority*. (t) If deemed appropriate by the *competent authority*, reference to the identity of the applicant. (u) Signature and identification of the certifying official.	(v) any allowance (based on para. 674(b)) for a change in neutron multiplication assumed in the criticality assessment as a result of actual irradiation experience; and (vi) the ambient temperature range for which the *package design* has been approved. (n) For *Type B(M) packages*, a statement specifying those prescriptions of paras 637, 653, 654 and 657–664 with which the *package* does not conform and any amplifying information which may be useful to other *competent authorities*. **(n) (bis) For *packages* containing more than 0.1 kg of uranium hexafluoride a statement specifying those prescriptions of para 632 that apply, if any, and any amplifying information which may be useful to other *competent authorities*.** (o) A detailed listing of any supplementary operational controls required for preparation, loading, carriage, unloading and handling of the *consignment*, including any special stowage provisions for the safe dissipation of heat. (p) Reference to information provided by the applicant relating to the use of the *packaging* or specific actions to be taken prior to *shipment*. (q) A statement regarding the ambient conditions assumed for purposes of *design* if these are not in accordance with those specified in paras 653, 654 and 664, as applicable. (r) A specification of the applicable *quality assurance* programme as required in para. 310. (s) Any emergency arrangements deemed necessary by the *competent authority*. (t) If deemed appropriate by the *competent authority*, reference to the identity of the applicant. (u) Signature and identification of the certifying official.

Change	IAEA para	UN para	Existing text in TS-R-1 (2003)	Text Recommended by Review Panel No. 2
57	833	6.4.23.14	833. Each approval certificate of the *design* of a *package* issued by a *competent authority* shall include the following information: (a) Type of certificate. (b) The *competent authority* identification mark. (c) The issue date and an expiry date. (d) Any restriction on the modes of transport, if appropriate. (e) List of applicable national and international regulations, including the edition of the IAEA Regulations for the Safe Transport of Radioactive Material under which the *design* is approved. (f) The following statement: "This certificate does not relieve the consignor from compliance with any requirement of the government of any country through or into which the package will be transported." (g) References to certificates for alternative *radioactive contents*, other *competent authority* validation, or additional technical data or information, as deemed appropriate by the *competent authority*. (h) A statement authorizing *shipment* where *shipment* approval is required under para. 820, if deemed appropriate. (i) Identification of the *packaging*. (j) Description of the *packaging* by a reference to the drawings or specification of the *design*. If deemed appropriate by the *competent authority*, a reproducible illustration, not larger than 21 cm by 30 cm, showing the make-up of the *package* should also be provided, accompanied by a brief description of the *packaging*, including materials of manufacture, gross mass, general outside dimensions and appearance.	833. Each approval certificate of the *design* of a *package* issued by a *competent authority* shall include the following information: (a) Type of certificate. (b) The *competent authority* identification mark. (c) The issue date and an expiry date. (d) Any restriction on the modes of transport, if appropriate. (e) List of applicable national and international regulations, including the edition of the IAEA Regulations for the Safe Transport of Radioactive Material under which the *design* is approved. (f) The following statement: "This certificate does not relieve the consignor from compliance with any requirement of the government of any country through or into which the package will be transported." (g) References to certificates for alternative *radioactive contents*, other *competent authority* validation, or additional technical data or information, as deemed appropriate by the *competent authority*. (h) A statement authorizing *shipment* where *shipment* approval is required under para. 820, if deemed appropriate. (i) Identification of the *packaging*. (j) Description of the *packaging* by a reference to the drawings or specification of the *design*. If deemed appropriate by the *competent authority*, a reproducible illustration, not larger than 21 cm by 30 cm, showing the make-up of the *package* should also be provided, accompanied by a brief description of the *packaging*, including materials of manufacture, gross mass, general outside dimensions and appearance.

Change	IAEA para	UN para	Existing text in TS-R-1 (2003)	Text Recommended by Review Panel No. 2
			(k) Specification of the *design* by reference to the drawings. (l) A specification of the authorized *radioactive content*, including any restrictions on the *radioactive contents* which might not be obvious from the nature of the *packaging*. This shall include the physical and chemical forms, the activities involved (including those of the various isotopes, if appropriate), amounts in grams (for *fissile material*), and whether *special form radioactive material* or *low dispersible radioactive material*, if applicable. (m) Additionally, for *packages* containing *fissile material*: (i) a detailed description of the authorized *radioactive contents*; (ii) the value of the *criticality safety index*; (iii) reference to the documentation that demonstrates the criticality safety of the contents; (iv) any special features, on the basis of which the absence of water from certain void spaces has been assumed in the criticality assessment; (v) any allowance (based on para. 674(b)) for a change in neutron multiplication assumed in the criticality assessment as a result of actual irradiation experience; and (vi) the ambient temperature range for which the *package design* has been approved. (n) For *Type B(M) packages*, a statement specifying those prescriptions of paras 637, 653, 654 and 657–664 with which the *package* does not conform and any amplifying information which may be useful to other *competent authorities*. (o) A detailed listing of any supplementary operational controls required for preparation, loading, carriage, unloading and handling of the *consignment*, including any special stowage provisions for the safe dissipation	(k) Specification of the *design* by reference to the drawings. (l) A specification of the authorized *radioactive content*, including any restrictions on the *radioactive contents* which might not be obvious from the nature of the *packaging*. This shall include the physical and chemical forms, the activities involved (including those of the various isotopes, if appropriate), amounts in grams (for *fissile material*), and whether *special form radioactive material* or *low dispersible radioactive material*, if applicable. **(l) (bis) A description of the *containment system*** (m) Additionally, for *packages* containing *fissile material*: (i) a detailed description of the authorized *radioactive contents*; **(i bis) A description of the *confinement system*** (ii) the value of the *criticality safety index*; (iii) reference to the documentation that demonstrates the criticality safety of the contents; (iv) any special features, on the basis of which the absence of water from certain void spaces has been assumed in the criticality assessment; (v) any allowance (based on para. 674(b)) for a change in neutron multiplication assumed in the criticality assessment as a result of actual irradiation experience; and (vi) the ambient temperature range for which the *package design* has been approved. (n) For *Type B(M) packages*, a statement specifying those prescriptions of paras 637, 653, 654 and 657–664 with which the *package* does not conform and any amplifying information which may be useful to other *competent authorities*. (o) A detailed listing of any supplementary operational controls required for preparation, loading, carriage, unloading and handling of the *consignment*, including

Change	IAEA para	UN para	Existing text in TS-R-1 (2003)	Text Recommended by Review Panel No. 2
			any special stowage provisions for the safe dissipation of heat. (p) Reference to information provided by the applicant relating to the use of the *packaging* or specific actions to be taken prior to *shipment*. (q) A statement regarding the ambient conditions assumed for purposes of *design* if these are not in accordance with those specified in paras 653, 654 and 664, as applicable. (r) A specification of the applicable *quality assurance* programme as required in para. 310. (s) Any emergency arrangements deemed necessary by the *competent authority*. (t) If deemed appropriate by the *competent authority*, reference to the identity of the applicant. (u) Signature and identification of the certifying official.	any special stowage provisions for the safe dissipation of heat. (p) Reference to information provided by the applicant relating to the use of the *packaging* or specific actions to be taken prior to *shipment*. (q) A statement regarding the ambient conditions assumed for purposes of *design* if these are not in accordance with those specified in paras 653, 654 and 664, as applicable. (r) A specification of the applicable *quality assurance* programme as required in para. 310. (s) Any emergency arrangements deemed necessary by the *competent authority*. (t) If deemed appropriate by the *competent authority*, reference to the identity of the applicant. (u) Signature and identification of the certifying official.
59	Schedules	Schedules are not in UN	Schedule 5, Part 9 (b) For unpackaged *LSA-I* in a *freight container* or *tank*, or where an *exclusive use consignment* in a *freight container* is packaged *LSA-I* and no other UN Number commodities are present in the *freight container*, the UN Number "2912" shall be displayed on all four sides of the *freight container* or *tank*, either in the lower half of the placards shown in Fig. 6, and against the white background, or on the placards shown in Fig. 7. Schedule 6, Part 9 (b) Where an *exclusive use consignment* in a *freight container* is non-fissile or fissile-excepted *LSA-II* and no other UN Number commodities are present in the *freight container,* "3321" shall be displayed on all four sides of the *freight*	Schedule 5, Part 9 (b) For unpackaged *LSA-I* in a *freight container* or *tank*, or where an *exclusive use consignment* in a *freight container* is packaged *LSA-I* and no other UN Number commodities are present in the *freight container*, the UN Number "2912" shall be displayed on all four sides of the *freight container* or *tank*, either in the lower half of the placards shown in Fig. 6, and against the white background, or on the placards shown in Fig. 7. **However if the packages contain non-fissile or fissile-excepted uranium hexafluoride, "2978" shall be displayed.** Schedule 6, Part 9 (b) Where an *exclusive use consignment* in a *freight container* is non-fissile or fissile-excepted *LSA-II* and no other UN Number commodities are present in the *freight container,* "3321" shall be displayed on all four sides of the *freight container*, either

Change	IAEA para	UN para	Existing text in TS-R-1 (2003)	Text Recommended by Review Panel No. 2
			container, either in the lower half of the placards shown in Fig. 6, and against the white background, or on the placards shown in Fig. 7. In the case of *fissile material* transported as *LSA-II*, "3324" shall be displayed on the placards.	in the lower half of the placards shown in Fig. 6, and against the white background, or on the placards shown in Fig. 7. In the case of *fissile material* transported as *LSA-II*, "3324" shall be displayed on the placards. **However if the packages contain non-fissile or fissile-excepted uranium hexafluoride, "2978" shall be displayed. If the packages contain uranium hexafluoride that is fissile material, "2977" shall be displayed.**
			Schedule 7, Part 9 (b) Where an *exclusive use consignment* in a *freight container* is non-fissile or fissile-excepted *LSA-III* and no other UN Number commodities are present in the *freight container,* "3322" shall be displayed on all four sides of the *freight container*, either in the lower half of the placards shown in Fig. 6, and against the white background, or on the placards shown in Fig. 7. In the case of *fissile material* transported as *LSA-III*, "3325" shall be displayed on the placards.	Schedule 7, Part 9 (b) Where an *exclusive use consignment* in a *freight container* is non-fissile or fissile-excepted *LSA-III* and no other UN Number commodities are present in the *freight container,* "3322" shall be displayed on all four sides of the *freight container*, either in the lower half of the placards shown in Fig. 6, and against the white background, or on the placards shown in Fig. 7. In the case of *fissile material* transported as *LSA-III*, "3325" shall be displayed on the placards. **However if the packages contain non-fissile or fissile-excepted uranium hexafluoride, "2978" shall be displayed. If the packages contain uranium hexafluoride that is fissile material, "2977" shall be displayed.**
			Schedule 9, Part 9 (c) Where an *exclusive use consignment* in a *freight container* is non-fissile or fissile-excepted *radioactive material* in *Type A packages* and no other UN Number commodities are present in the *freight container,* "2915" shall be displayed on all four sides of the *freight container*, either in the lower half of the placards shown in Fig. 6,	Schedule 9, Part 9 (c) Where an *exclusive use consignment* in a *freight container* is non-fissile or fissile-excepted *radioactive material* in *Type A packages* and no other UN Number commodities are present in the *freight container,* "2915" shall be displayed on all four sides of the *freight container*, either in the lower half of the placards shown in Fig. 6, and against the white background, or on the placards shown in Fig. 7. In the case of *fissile material* transported in *Type A packages*,

Change	IAEA para	UN para	Existing text in TS-R-1 (2003)	Text Recommended by Review Panel No. 2
			and against the white background, or on the placards shown in Fig. 7. In the case of *fissile material* transported in *Type A packages*, "3327" shall be displayed on the placards.	"3327" shall be displayed on the placards. **However if the Type A packages contain non-fissile or fissile-excepted uranium hexafluoride, "2978" shall be displayed. If the packages contain uranium hexafluoride that is fissile material, "2977" shall be displayed.**
61	302, 306, 307, 562	1.1.2.2.3, 7.1.7.1.1, 7.1.7.1.3	**NOTE. ONLY THE PARAGRAPHS WHICH THE REVIEW PANEL RECOMMENDS TO BE REVISED ARE LISTED HERE** 302. In transport, protection and safety shall be optimized in order that the magnitude of individual doses, the number of persons exposed, and the likelihood of incurring exposure shall be kept as low as reasonably achievable, economic and social factors being taken into account, **and doses to persons shall be below the relevant dose limits.** A structured and systematic approach shall be adopted and shall include consideration of the interfaces between transport and other activities. **306. *Radioactive material* shall be segregated sufficiently from workers and from members of the public. The following values for dose shall be used for the purpose of calculating segregation distances or *radiation levels*:** **(a) for workers in regularly occupied working areas a dose of 5 mSv in a year;** **(b) for members of the public, in areas where the public has regular access, a dose of 1 mSv in a year to the critical group, taking account of exposures expected to be delivered by all other**	302. In transport, **doses to persons shall be below the relevant dose limits.** Protection and safety shall be optimized in order that the magnitude of individual doses, the number of persons exposed, and the likelihood of incurring exposure shall be kept as low as reasonably achievable, economic and social factors being taken into account, **within the restriction that the doses to individuals be subject to dose constraints.** A structured and systematic approach shall be adopted and shall include consideration of the interfaces between transport and other activities. **306. deleted**

Change	IAEA para	UN para	Existing text in TS-R-1 (2003)	Text Recommended by Review Panel No. 2
			relevant sources and practices under control. **307. *Radioactive material* shall be sufficiently segregated from undeveloped photographic film. The basis for determining segregation distances for this purpose shall be that the radiation exposure of undeveloped photographic film due to the transport of *radioactive material* be limited to 0.1 mSv per *consignment* of such film.** 562. *Packages*, *overpacks* and *freight containers* containing *radioactive material* shall be segregated during transport and during storage in transit: (a) from places occupied by persons and from undeveloped photographic film, for radiation exposure control purposes, in accordance with paras 306 and 307, and (b) from other dangerous goods in accordance with para. 506.	**307. deleted** 562. *Packages*, *overpacks* and *freight containers* containing *radioactive material* **and unpackaged *radioactive material*** shall be segregated during transport and during storage in transit: **(a) from workers in regularly occupied working areas by distances calculated using a dose criterion of 5 mSv in a year and conservative model parameters;** **(b) from members of the critical group of the public, in areas where the public has regular access, by distances calculated using a dose criterion of 1 mSv in a year and conservative model parameters;** **(c) from undeveloped photographic film by distances calculated using a radiation exposure criterion for** undeveloped photographic film due to the transport of *radioactive material* of 0.1 mSv per *consignment* of such film**;** and **(d)** from other dangerous goods in accordance with para. 506.
62	533, 533bis, 549	2.7.8.4, 5.4.1.5.7.1 other?	533. *Packages* and *overpacks* shall be assigned to either category I-WHITE, II-YELLOW or III-YELLOW in accordance with the conditions specified in Table VII and	533. *Packages* and *overpacks* shall be assigned to either category I-WHITE, II-YELLOW or III-YELLOW in accordance with the conditions specified in Table VII and

Change	IAEA para	UN para	Existing text in TS-R-1 (2003)	Text Recommended by Review Panel No. 2
			with the following requirements: (a) For a *package* or *overpack*, both the *transport index* and the surface *radiation level* conditions shall be taken into account in determining which is the - appropriate category. Where the *transport index* satisfies the condition for one category but the surface *radiation level* satisfies the condition for a different category, the *package* or *overpack* shall be assigned to the higher category. For this purpose, category I-WHITE shall be regarded as the lowest category. (b) The *transport index* shall be determined following the procedures specified in paras 526 and 527. (c) If the surface *radiation level* is greater than 2 mSv/h, the *package* or *overpack* shall be transported under *exclusive use* and under the provisions of paras 572(a), 574 or 578, as appropriate. (d) A *package* transported under a *special arrangement* shall be assigned to category III-YELLOW. (e) An *overpack* which contains *packages* transported under *special arrangement* shall be assigned to category III-YELLOW.	with the following requirements: (a) For a *package* or *overpack*, both the *transport index* and the surface *radiation level* conditions shall be taken into account in determining which is the appropriate category. Where the *transport index* satisfies the condition for one category but the surface *radiation level* satisfies the condition for a different category, the *package* or *overpack* shall be assigned to the higher - category. For this purpose, category I-WHITE shall be regarded as the lowest category. (b) The *transport index* shall be determined following the procedures specified in paras 526 and 527. (c) If the surface *radiation level* is greater than 2 mSv/h, the *package* or *overpack* shall be transported under *exclusive use* and under the provisions of paras 572(a), 574 or 578, as appropriate. (d) A *package* transported under a *special arrangement* shall be assigned to category III-YELLOW **except under the provisions of para 533 bis**. (e) An *overpack* which contains *packages* transported under *special arrangement* shall be assigned to category III-YELLOW **except under the provisions of para 533 bis**. **533 bis For each package the UN number and proper shipping name shall be determined (see Table VIII). In all cases of international transport of packages requiring competent authority design or shipment approval, for which different approval types apply in the different countries concerned by the shipment, the UN number, proper shipping name, labelling and marking shall be in accordance with the certificate of the country**

Change	IAEA para	UN para	Existing text in TS-R-1 (2003)	Text Recommended by Review Panel No. 2
				of origin of design.
			549. The *consignor* shall include in the transport documents with each *consignment* the following information, as applicable in the order given: (a) The proper shipping name, as specified in Table VIII; (b) The United Nations Class number "7"; (c) The United Nations number assigned to the material as specified in Table VIII, preceded by the letters "UN"; (d) The name or symbol of each radionuclide or, for mixtures of radionuclides, an appropriate general description or a list of the most restrictive nuclides; (e) A description of the physical and chemical form of the material, or a notation that the material is *special form radioactive material* or *low dispersible radioactive material*. A generic chemical description is acceptable for chemical form; (f) The maximum activity of the *radioactive contents* during transport expressed in units of becquerels (Bq) with an appropriate SI prefix (see Annex II). For *fissile material*, the mass of *fissile material* in units of grams (g), or appropriate multiples thereof, may be used in place of activity; (g) The category of the *package*, i.e. I-WHITE, II-YELLOW, III-YELLOW; (h) The *transport index* (categories II-YELLOW and III-YELLOW only); (i) For *consignments* including *fissile material* other than *consignments* excepted under para. 672, the *criticality safety index*; (j) The identification mark for each *competent authority* approval certificate (*special form radioactive*	549. The *consignor* shall include in the transport documents with each *consignment* the following information, as applicable in the order given: (a) The proper shipping name, as specified in **accordance with the provisions of para 533 bis**; (b) The United Nations Class number "7"; (c) The United Nations number assigned to the material as specified in **accordance with the provisions of para 533 bis**, preceded by the letters "UN"; (d) The name or symbol of each radionuclide or, for mixtures of radionuclides, an appropriate general description or a list of the most restrictive nuclides; (e) A description of the physical and chemical form of the material, or a notation that the material is *special form radioactive material* or *low dispersible radioactive material*. A generic chemical description is acceptable for chemical form; (f) The maximum activity of the *radioactive contents* during transport expressed in units of becquerels (Bq) with an appropriate SI prefix (see Annex II). For *fissile material*, the mass of *fissile material* in units of grams (g), or appropriate multiples thereof, may be used in place of activity; (g) The category of the *package*, i.e. I-WHITE, II-YELLOW, III-YELLOW; (h) The *transport index* (categories II-YELLOW and III-YELLOW only); (i) For *consignments* including *fissile material* other than *consignments* excepted under para. 672, the *criticality safety index*; (j) The identification mark for each *competent authority*

Change	IAEA para	UN para	Existing text in TS-R-1 (2003)	Text Recommended by Review Panel No. 2
			material, *low dispersible radioactive material*, *special arrangement*, *package design*, or *shipment*) applicable to the *consignment*; (k) For *consignments* of more than one *package*, the information contained in para. 549(a) to (j) shall be given for each *package*. For *packages* in an *overpack*, *freight container*, or *conveyance*, a detailed statement of the contents of each *package* within the *overpack*, *freight container,* or *conveyance* and, where appropriate, of each *overpack*, *freight container*, or *conveyance* shall be included. If *packages* are to be removed from the *overpack, freight container*, or *conveyance* at a point of intermediate unloading, appropriate transport documents shall be made available; (l) Where a *consignment* is required to be shipped under *exclusive use*, the statement "EXCLUSIVE USE SHIPMENT"; and (m) For *LSA-II*, *LSA-III*, *SCO-I* and *SCO-II*, the total activity of the *consignment* as a multiple of A_2.	approval certificate (*special form radioactive material*, *low dispersible radioactive material*, *special arrangement*, *package design*, or *shipment*) applicable to the *consignment*; (k) For *consignments* of more than one *package*, the information contained in para. 549(a) to (j) shall be given for each *package*. For *packages* in an *overpack*, *freight container*, or *conveyance*, a detailed statement of the contents of each *package* within the *overpack*, *freight container,* or *conveyance* and, where appropriate, of each *overpack*, *freight container*, or *conveyance* shall be included. If *packages* are to be removed from the *overpack, freight container*, or *conveyance* at a point of intermediate unloading, appropriate transport documents shall be made available; (l) Where a *consignment* is required to be shipped under *exclusive use*, the statement "EXCLUSIVE USE SHIPMENT"; and (m) For *LSA-II*, *LSA-III*, *SCO-I* and *SCO-II*, the total activity of the *consignment* as a multiple of A_2.

Appendix 1 Change # 5, Changes to TABLE XII (UN Table 6.4.11.2)

EXISTING TABLE XII

TABLE XII. CONSIGNMENT MASS LIMITS FOR EXCEPTIONS FROM THE REQUIREMENTS FOR PACKAGES CONTAINING FISSILE MATERIAL

Fissile material	*Fissile material* mass (g) mixed with substances having an average hydrogen density less than or equal to water	*Fissile material* mass (g) mixed with substances having an average hydrogen density greater than water
Uranium-235 (X)	400	290
Other *fissile material* (Y)	250	180

RECOMMENDED TABLE XII (UN Table 6.4.11.2)

TABLE XII. CONSIGNMENT MASS LIMITS FOR EXCEPTIONS FROM THE REQUIREMENTS FOR PACKAGES CONTAINING FISSILE MATERIAL

*Fissile **nuclide***	*Fissile **nuclide*** mass (g) mixed with substances having an average hydrogen density less than or equal to water	*Fissile **nuclide*** mass (g) mixed with substances having an average hydrogen density greater than water
Uranium-235 (X)	400	290
Other *fissile **nuclides*** (Y)	250	180