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**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-fifth session, 5-14 July 2004  
Item 8 of the provisional agenda

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

Note by the secretariat

**Introduction**

The International Atomic Energy Agency (IAEA) 9th Meeting of the Transport Safety Standards Committee (TRANSSC IX) (Vienna, 22-26 March 2004) considered all changes to the IAEA Regulations for the Safe Transport of Radioactive Material proposed by the IAEA "Review Panel" as a result of its work in 2002 and 2003 (see also ST/SG/AC.10/C.3/2003/2, ST/SG/AC.10/C.3/2003/3 and ST/SG/AC.10/C.3/2003/24 and informal documents UN/SCETDG/24/INF.23 and -/INF.61).

TRANSSC IX approved most of these changes, which should be reflected in the 2005 version of the IAEA Regulations subject to endorsement by the Commission on Safety Standards (CSS) and approval by the Board of Governors.

The secretariat has prepared a list of corresponding changes to the UN Model Regulations, for information of the Sub-Committee in view of their final adoption at the December session.

GE.04-21291

IAEA change reference	UN para.	Proposed changes
61	1.1.2.2.3	<p>Insert the following first sentence:</p> <p>"Doses to persons shall be below the relevant dose limits."</p> <p>At the end of the existing first sentence, add:</p> <p>", within the restriction that the doses to individuals be subject to dose constraints."</p>
10	1.1.2.2.4	<p>Replace "the radiation hazards involved and" with "radiation protection including"</p> <p>Replace "to ensure restriction of their exposure and that " with "to restrict their occupational exposure and the exposure".</p>
Minor	1.1.2.2.5	<p>In the French version, replace "dose effective" with "dose efficace".</p>
11		<p>Delete indent (a) and renumber (b) and (c) as (a) and (b).</p>
55	1.1.2.4.2	<p>Delete "international", in the last sentence.</p>
Minor	2.7.1.2	<p>(e) Replace "the values specified in 2.7.7.2. " with "the values specified in 2.7.7.2.1 (b), or calculated in accordance with 2.7.7.2.2 to 2.7.7.2.6"</p>
1	2.7.2	<p>Amend the definitions of Multilateral approval to read as follows:</p> <p><i>"Multilateral approval</i> means approval by the relevant competent authority both of the country of origin of the design or shipment, <b>as applicable and of each country through or into which the consignment is to be transported also, where the consignment is to be transported through or into any other country, approval by the competent authority of that country.</b> The term "through or into" specifically excludes "over", i.e. the approval and notification requirements ..." (rest unchanged).</p>
		<p>Amend the definition of "Freight container" to read as follows:</p>
Minor		<p><i>"Freight</i> container in the case of radioactive material transport means an article ... without intermediate reloading <b>which is it shall be</b> of a permanent enclosed character,..." (rest unchanged)</p>
Minor		<p>In the definition of "<i>Specific activity of a radionuclide</i>", delete: "or volume "</p> <p>Amend the definition of "Uranium-natural, depleted, enriched, to read:</p>
Minor		<p><i>"Uranium - natural, depleted, enriched</i> means the following:</p> <p><i>Natural uranium</i> means <b>uranium (which may be chemically separated)</b> containing the naturally occurring distribution of uranium ..." (rest unchanged).</p>

IAEA change reference	UN para.	Proposed changes																
Minor	2.7.3.2	(a) (ii) Amend to read: "Natural uranium, depleted uranium, natural thorium or their compounds or mixtures, providing they are unirradiated and in solid or liquid form;"																
39	2.7.4.6 (a)	<p>Amend to read:</p> <p>“(a) The tests prescribed in 2.7.4.5 (a) and 2.7.4.5 (b) provided the mass of the special form radioactive material</p> <p>(i) is less than 200 g and they are alternatively subjected to the Class 4 impact test prescribed in ISO 2919:1990 "Radiation protection - Sealed radioactive sources - General requirements and classification"; or</p> <p><b>(ii) is less than 500 g and they are alternatively subjected to the Class 5 impact test prescribed in ISO 2919: 1990: “Sealed Radioactive Sources – Classification”, and”</b></p>																
27	2.7.7.1.7	<p>Amend the beginning to read:</p> <p>"Unless excepted by 6.4.11.2, packages... (remainder unchanged).</p>																
17	2.7.7.1.8	<p>Amend to read as follows:</p> <p>"Packages containing uranium hexafluoride shall not contain:</p> <p>(a) a mass of uranium hexafluoride different from that authorized for the package design;</p> <p>(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</p> <p>(c) uranium hexafluoride other than in solid form or at an internal pressure above atmospheric pressure when presented for transport."</p>																
Minor	Table 2.7.7.2.1	<p>Amend the value in the right column for Te-121m to read "<math>1 \times 10^6</math>" instead of "<math>1 \times 10^5</math>".</p>																
12	Table 2.7.7.2.1	<p>Footnote (a) and (b); amend to read as follows:</p> <p>(a) <math>A_1</math> and/or <math>A_2</math> values for these parent radionuclides include contributions from daughter radionuclides with half-lives less than 10 days, as listed in the following:</p> <table border="0" data-bbox="560 1682 858 1946"> <tr> <td>Mg 28</td> <td>Al 28</td> </tr> <tr> <td>Ar 42</td> <td>K 42</td> </tr> <tr> <td>Ca 47</td> <td>Sc 47</td> </tr> <tr> <td>Ti 44</td> <td>Sc 44</td> </tr> <tr> <td>Fe 52</td> <td>Mn 52m</td> </tr> <tr> <td>Fe 60</td> <td>Co 60m</td> </tr> <tr> <td>Zn 69m</td> <td>Zn 69</td> </tr> <tr> <td>Ge 68</td> <td>Ga 68</td> </tr> </table>	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
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																	

**IAEA  
change  
reference**

**UN para.**

**Proposed changes**

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
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

IAEA change reference	UN para.	Proposed changes																																										
		<table border="0"> <tr><td>At 211</td><td>Po 211</td></tr> <tr><td>Rn 222</td><td>Po 218, Pb 214, At 218, Bi 214, Po 214</td></tr> <tr><td>Ra 223</td><td>Rn 219, Po 215, Pb 211, Bi 211, Po 211, Tl 207</td></tr> <tr><td>Ra 224</td><td>Rn 220, Po 216, Pb 212, Bi 212, Tl 208, Po 212</td></tr> <tr><td>Ra 225</td><td>Ac 225, Fr 221, At 217, Bi 213, Tl 209, Po 213, Pb 209</td></tr> <tr><td>Ra 226</td><td>Rn 222, Po 218, Pb 214, At 218, Bi 214, Po 214</td></tr> <tr><td>Ra 228</td><td>Ac 228</td></tr> <tr><td>Ac 225</td><td>Fr 221, At 217, Bi 213, Tl 209, Po 213, Pb 209</td></tr> <tr><td>Ac 227</td><td>Fr 223</td></tr> <tr><td>Th 228</td><td>Ra 224, Rn 220, Po 216, Pb 212, Bi 212, Tl 208, Po 212</td></tr> <tr><td>Th 234</td><td>Pa 234m, Pa 234</td></tr> <tr><td>Pa 230</td><td>Ac 226, Th 226, Fr 222, Ra 222, Rn 218, Po 214</td></tr> <tr><td>U 230</td><td>Th 226, Ra 222, Rn 218, Po 214</td></tr> <tr><td>U 235</td><td>Th 231</td></tr> <tr><td>Pu 241</td><td>U 237</td></tr> <tr><td>Pu 244</td><td>U 240, Np 240m</td></tr> <tr><td>Am 242m</td><td>Am 242, Np 238</td></tr> <tr><td>Am 243</td><td>Np 239</td></tr> <tr><td>Cm 247</td><td>Pu 243</td></tr> <tr><td>Bk 249</td><td>Am 245</td></tr> <tr><td>Cf 253</td><td>Cm 249”</td></tr> </table>	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	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”
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Cm 247	Pu 243																																											
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Cf 253	Cm 249”																																											
13		<p>(b) Insert “Ag-108m            Ag-108” after: ”Ru-106            Rh-106”.</p> <p>Delete the entries for: "Ce-134, La 134"; "Rn-220, Po 216"; "Th-226, Ra-222, Rn-218, Po-214"; and "U-240, Np-240m".</p>																																										
14	2.7.7.2.2	<p>Amend to read as follows:</p> <p>“For individual radionuclides which are not listed in Table 2.7.7.2.1 the determination of the basic radionuclide values referred to in 2.7.7.2.1 shall require <del>competent authority approval or, for international transport, multilateral approval. Where the chemical form of each radionuclide is known, it</del> <b>It is permissible to use an A<sub>2</sub> value calculated using a dose coefficient for the appropriate lung absorption type</b> as recommended by the International Commission on Radiological Protection, if the chemical forms <b>of each radionuclide</b> under both normal...”...(rest unchanged).</p>																																										
15	Table 2.7.7.2.2	<p>Amend the second entry in the first column to read:</p> <p><b>“Alpha emitting nuclides but no neutron emitters</b> are known to be present”</p> <p>Amend the third entry in the first column to read:</p> <p><b>“Neutron emitting nuclides are known to be present or no relevant data are available.”</b></p>																																										

IAEA change reference	UN para.	Proposed changes
62	2.7.8.4 (d) and (e)	Add: "except under the provisions of 2.7.8.5".
62	2.7.8.5	Add a new 2.7.8.5 to read:  "In case 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, assignment to the category as required in 2.7.8.4 shall be in accordance with the certificate of the country of origin of design."
20, 59	<b>Chapter 3.2</b>	In column 6, assign special provision XXX to UN Nos 2912, 2915, 3321, 3322, <del>3323</del> ; special provision XXY to UN Nos 3324, 3325, 3327, <del>3328, 3329, 3330</del> .
20, 59	<b>Chapter 3.3</b>	Add new special provisions XXX and XXY to read as follows:
20, 59		"XXX In the case of non-fissile or fissile excepted uranium hexafluoride, the material shall be classified under UN No 2978.
		XXY In the case of fissile uranium hexafluoride, the material shall be classified under UN No. 2977."
	4.1.9.1.3	Amend to read:
19		<b>"A package shall not contain any items other than those that are necessary for the use of the radioactive material. The interaction between these items and the package under the conditions of transport applicable to the design, shall not reduce the safety of the package."</b>
	4.1.9.2.2	Amend to read:
Minor		<b>"For LSA material and SCO which is or contains fissile material shall meet the applicable requirements of 6.4.11.1, 7.1.7.4.1 and 7.1.7.4.2 shall be met"</b>
	5.1.5.1.2 (c)	Amend to read:
18		"(c) For each package requiring competent authority approval, it shall be ensured that all the requirements specified in the approval certificates have been satisfied;"
	5.1.5.2.2 (c)	Amend to read:
54		<b>"The shipment of packages containing fissile materials if the sum of the - criticality safety indexes of the packages 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</b>

IAEA change reference	UN para.	Proposed changes
		<b>the distance of 6 m between groups of packages or overpacks as required in table 7.1.7.4.2 is met; and”</b>
Minor	5.1.5.2.4 (d)	(ii) Replace “routing” with “routeing”.
22	5.2.1.5.4 (c)	(c) Replace the end of the sentence with "either the name of the manufacturer or other identification of the packaging specified by the competent authority of the country of origin of design."
		Add:
62	"5.2.1.5.8	In case of international transport of packages requiring competent authority design or shipment approval, for which different approval types apply in the different countries concerned, marking shall be in accordance with the certificate of the country of origin of the design."
Minor	5.2.2.1.12.2 (b) 5.4.1.5.7.1(c) 5.1.5.2.4(d)(v)	Insert “symbol” after “SI prefix”.
		Add:
62	"5.2.2.1.12.5	In case of international transport of packages requiring competent authorities design or shipment approval, for which different approval types apply in the different countries concerned, labelling shall be in accordance with the certificate of the country of origin of design."
Minor	5.3.1.1.5.1	Replace: “which conform with the model7D” with “which conform <b>to</b> the model7D”.
Minor	5.4.1.5.7.2(b)	Replace "routing" with "routeing"
		Add:
62	"5.4.1.5.7.3	In case of international transport of packages requiring competent authorities design or shipment approval, for which different approval types apply in the different countries concerned, the UN number and proper shipping name required in 5.4.1.4.1 shall be in accordance with the certificate of the country of origin of design."
	6.4.5.2	Amend sub-paragraph (b) to read:
24		“(b) more than a 20% increase in the maximum radiation level at any external surface of the package.”
		Consequential changes in 6.4.5.4.1(c) (ii), 6.4.5.4.2(i), 6.4.5.4.4(c) (ii), 6.4.5.4.5(b) (ii) and 6.4.7.14(b).

IAEA change reference	UN para.	Proposed changes
Minor	6.4.7.16	Amend the beginning as follows: "A Type A package designed to contain <del>liquids</del> <b>liquid radioactive material</b> shall, in addition:".
	6.4.8.3	Amend to read:
26		<del>"Except as required in 6.4.3.1 for a package transported by air, a</del> A package shall be so designed that, under the ambient condition specified in 6.4.8.5 <b>and in the absence of insolation</b> , the temperature of the accessible surfaces of a package shall not exceed 50 °C, unless the package is transported under exclusive use."
26	6.4.8.13	Delete this paragraph and replace it with <b>6.4.8.4</b> as follows:
26	"6.4.8.4	Except as required in 6.4.3.1 for a package transported by air, the maximum temperature of any surface readily accessible during transport of a package <b>under exclusive use</b> shall not exceed 85 °C in the absence of insolation under the ambient conditions specified in 6.4.8.5. <del>The package shall be carried under exclusive use, as specified in 6.4.8.3, if this maximum temperature exceeds 50 °C.</del> 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."
26	6.4.8.4 to 6.4.8.12	Renumber as 6.4.8.5 to 6.4.8.13. Amend all cross-references accordingly.
32	6.4.11.2 (a)	Amend the end of the introductory sentence to read: "provided that the smallest external dimension of each package is not less than 10 cm and that either : "
31		Amend (a) (iii) to read as follows:  "(iii) there <b>are not</b> more than 5 g of <i>fissile material</i> in any 10 litre volume of material. Neither beryllium nor deuterium shall be present in quantities exceeding 1% of the applicable consignment mass limits provided in <b>Table 6.4.11.2, except for deuterium in natural concentration in hydrogen.</b> "
38	6.4.11.7	(b) Amend the beginning to read: "For packages containing uranium hexafluoride only, <b>with maximum enrichment of 5 mass percent uranium-235:</b> "
42	6.4.22.1	(a) and (b) Amend to read as follows:  "(a) <b>Each design that meets the requirements of 6.4.6.4 shall require multilateral approval;</b> (b) <b>Each design that meets the requirement of 6.4.6.1 to 6.4.6.3 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> "



IAEA change reference	UN para.	Proposed changes
Minor	6.4.23.3 (a)	Replace “the consignment” with “the shipment”.
Minor	6.4.23.12 (e)	Replace “routing” with “routeing”.
	6.4.23.14	Insert new paragraphs, (l) (bis), (m) (i) (bis) and (n) ( bis) and renumber accordingly:
57		"(l) (bis) A description of the containment system;"
57		"(m) (i) (bis) A description of the confinement system;"
56		“(n) (bis) For <i>packages</i> containing more than 0.1 kg of uranium hexafluoride, a statement specifying those prescriptions of 6.4.6.4 that apply if any and any amplifying information which may be useful to other competent authorities.”
52	6.4.23.15	Delete the last sentence
49	6.4.24.3	In the first sentence, read: “...to be used <del>until 31 December 2003</del> , subject to: <b>multilateral approval of package design</b> , the mandatory programme of <i>quality assurance</i> ...”  Delete: “After this date use may continue subject, additionally, to multilateral approval of package design. “
61	7.1.7.1.1	Amend to read as follows:  "Packages, overpacks and <i>freight containers</i> containing <i>radioactive material</i> <b>and unpackaged radioactive material</b> shall be segregated during transport and during storage in transit: (a) <b>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> (b) <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;</b> (c) <b>from undeveloped photographic film by distances calculated using a radiation exposure criterion for undeveloped photographic film due to the transport of radioactive material fo 0.1 mSv per consignment of such film; and</b> (d) <b>from other dangerous goods in accordance with [7.1.2 and 7.1.3.2].</b>
61	7.1.7.1.3	Delete.
	7.1.7.3.3 (a)	Amend the beginning to read:

**IAEA  
change  
reference**

**UN para.**

**Proposed changes**

23

“Except under the condition of exclusive use, and for consignments of LSA-I material, the total number of packages, ...” (rest unchanged)

Delete the last sentence.

(g) Delete.

(Renumber (c) and (d) as (b) and (c) ).

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