

**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

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

Submitted by the World Nuclear Transport Institute (WNTI)

In efforts to harmonize the IAEA Transport Safety Regulations (TS-R-1) with the UN Model Regulations on the Transport of Dangerous Goods WNTI fully supports the work undertaken by the IAEA Consultants Service Meeting held in Vienna in February 2006. However, WNTI invites the Sub-Committee attention to certain details such as exemplified in Annex 1.

WNTI welcomes the objective of reconsidering the writing of the various chapters dealing with Class 7 with a view to facilitate the implementation of regulations. We have identified some adjustments of the proposal which might be helpful in assuring the best possible conformity with the overall Orange Book structure and principles, on this basis WNTI invites the Sub-Committee to consider the proposed amendments as found in Annex 2.

WNTI also has identified items not yet resolved in the 14th Edition of the UN Model Regulations on this basis WNTI invites the Sub-Committee to consider the proposals as found in Annex 3

WNTI gives it encouragement to the UN Committee and the IAEA to continue this process. We would welcome clarification on how this work is to continue.

Annex 1

Examples of corrections

A space is needed in 1.2.1 between the paragraphs concerning definitions of "Containment system" and "Criticality safety index"

1.5.1.5 requires a title: we propose "Specific provisions for the transport of excepted packages"

2.7.2.3.5 should be underlined

2.7.2.4.1.1 In the first sentence, "Packagings" shall be replaced by "Packages"

Annex 2

Proposed improvements for a better location of requirements:

These proposed adjustments are as follow:

- 1.5.1.4 (e) should be moved to 2.7.1.1 and
- 1.5.1.4 (f) should be moved to 2.7.1.2 (classification criteria).

- 2.7.1.1 should be completed by the text coming from 1.5.1.4 (e)
- 2.7.1.2 the existing text should be replaced by the one coming from 1.5.1.4 (f) (definition of “contamination”, “non-fixed contamination” and “fixed contamination” are already under 2.7.1.3)
- remove all the existing text under 2.7.2.3 to the chapter 6.4; replace the removed text by;
 - A radioactive material may be transported as special form radioactive material only if it complies with the requirements of a valid special form radioactive material approval certificate:
 - (a) Activities not greater than those authorized for the design;
 - (b) Radionuclides not different from those authorized for the design; or
 - (c) Material in a form, or a physical or chemical state not different from those authorized for the design;

Special form radioactive material shall comply with an approved design. Evidence that the special form radioactive material meets the applicable requirements of the regulation, including design requirements and test requirements, shall be include in the application for approval to the competent authority. This is done at the time of the design of a special form radioactive material, before manufacturing, by the designer. At the time of preparing a consignment, the consignor has to status on the fact that the radioactive material complies with a valid approved design for special form radioactive material before classify it as “radioactive material, special form.

For this reason WNTI considers the requirements which are under 2.7.2.3.3.1 to 2.7.2.3.3.8 should be removed from this chapter to the chapter 6.4 which is a more appropriate place for design requirements (moreover, requirement for the contents of application and approval certificate for special form radioactive materials are already in chapter 6.4)

- 2.7.2.3.5 : to have a link to the term "fissile-excepted" which is used in table 2.7.2.1.1, we propose to add "fissile-excepted" at the end of the first sentence: "...unless the following conditions are met (fissile-excepted):" - We shall have in mind that the existing text of the special provision 317 have to be revised (6.4.11.2 should be replaced by 2.7.2.3.5).
- 2.7.2.4.5.1: (a) (b) an (c) are really packing instructions, they do not affect the classification process. They would better be in 4.1.9.2.2 .. And the requirement should be "Any package containing uranium hexafluoride (natural, depleted or enriched uranium) in quantities of 0.1 kg or more shall be classified as “uranium hexafluoride”, or “uranium hexafluoride, fissile”. For lower quantities, the classification shall be made in connection with the package type.”
- 2.7.2.5: The same writing as it is for Type B(U) (see 2.7.2.4.6.1), should be used:

A package may be transported under special arrangement if it does not contain:

- (a) Activities greater than those authorized for the special arrangement approval;

- (b) Radionuclides different from those authorized for the special arrangement approval;
or
- (c) Contents in a form, or a physical or chemical state different from those authorized for the special arrangement approval;

as specified in the certificate of approval.

- 2.7.2.4.1.5: Proposal delete "not exceeding the limit specified in column 4"

WNTI disagrees with the interpretation made by the consultants of the IAEA regulations in 2.7.2.4 about the limitation of the content activity in case of empty packagings transported as excepted packages (it is probably useful that IAEA could give a clear statement on this subject before UN adopts such a text).

The proposal made by the consultants make applicable the activity limit of 10-3 A2 to the empty packagings transported as excepted packages.

This is an inexact interpretation of the TS-R.1 2005. Most of the consultants interpret the fact that, because no specific entry exists for empty packagings under "CONTENTS LIMITS FOR PACKAGES (§ 407) - Excepted packages" (§ 408 to 410) of TS-R.1 2005, then, activity content of such a packaging have to follow the requirements of § 408 (b), which require to limit the activity content to 10-3 A2.

If their interpretation was correct, then the same logic should be applied to the requirements made under "REQUIREMENTS AND CONTROLS FOR TRANSPORT OF EXCEPTED PACKAGES (§ 515 to 520)" of TS-R.1 2005. The requirements of § 518 should then be applicable in addition of those of the paragraph 520, and, as a consequence, empty packagings transported as excepted packages should bear the marking "RADIOACTIVE" on an internal surface.

This is clearly not the practice up to now despite this requirements have been written as they are in TS-R.1 2005 for a long time.

The activity limits of table 2.7.2.4.1.2 (table 3 of TS-R.1 2005) shall not apply in the case of empty packagings transported as excepted packages:

From the point of view of the safety, in the general case, the limitation of the danger presented by excepted packages during transport (especially in normal and accident conditions of transport) is based on the total activity transported in a package (10-3A2 for solid radioactive material not "special form") whatever the concentration and repartition of this activity in the package;

The limitation of the danger presented by an empty packaging transported as an excepted packages is based on the limitation of the non-fixed contamination of the internal surface (400 bq/cm² for beta and gamma emitters and low toxicity alpha emitters, 40 bq/cm² for other alpha emitters") whatever the total activity content.

NOTE: These internal contamination limits lead to total activities per package in the order of 10-3A2 per package for most of the packagings (e.g.: 10-3A2 of Co60 corresponds to 100 m² at 400 Bq/cm², 10-3A2 of Pu corresponds to 2.5 m² at 40 Bq/cm²).

Requiring that both, activity level and contamination level, have to be respected within a packaging which is basically much more robust than a basic excepted package (packaging usable as Types IP, A, B or C package) will be inconsistent with the principles developed by the IAEA for other excepted packages (safety is based only on the total activity content whatever its concentration).

Our proposal is that the limitation of the radioactive content of an empty packaging transported as an excepted package should only be limited to the contamination limits given in 2.7.2.4.1.5 (c).

Annex 3

Unresolved Issues

Part 2

UN numbers and proper shipping names

- 2.0.2.2 : examples should be given for particular case of radioactive material: this to point out that for radioactive classification, only some materials are “well-defined substances or articles” (a) and that all other proper shipping names are generic ones (b).

Proposed examples:

- 2978 RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE in (a),
- 2915 RADIOACTIVE MATERIAL, TYPE A PACKAGE in (b)

The strict application of 2.0.2.2 (and 3.1.1.2) has the following consequences:

- since uranium hexafluoride is specifically listed in the Dangerous Goods List, normally it cannot be shipped under other UN numbers,
- then, the shipment of this material under UN numbers assigned for shipment in excepted packages, or for shipment under special arrangement, would not be allowable.

However, providing that all applicable prescriptions for radioactive material in excepted packages are met, the IAEA regulations do not formally forbid the shipment of UF₆ in excepted packages, or under special arrangement. To restore this possibility, the following proposals are made:

- reserve the UN numbers 2977 and 2978 to quantities larger than 0.1 kg per package (in that case, for quantities lower than 0.1 kg per package, the proper shipping name will result of the type of material (LSA) and/or package (excepted, type A, type B(U), type B(M) or type C package),
- specify that, when uranium hexafluoride in quantities exceeding 0.1 kg per package is shipped under special arrangement, the proper shipping name should be UN2978 or UN2977.

Precedence of hazardous characteristics (2.0.3) needs probably to be revised to take into account that, in some cases, chemical risks can be more important than radioactive one, i.e. URANIUM HEXAFLUORIDE. As a minimum, some text shall be introduced to point out this possible situation.

Precedence of other hazardous properties, in the case of radioactive material in excepted packages having other hazardous properties, should be restricted to the cases where quantities of these other hazardous material are in excess of the limited quantities (as an example: how to classify 1 litre of nitric acid contaminated by radioactive substances at such a low level that it will be possible to meet all applicable requirements of an excepted package?). Note: coming back to the precedence of class 7 for radioactive material in excepted packages is only possible when labelling is not required for other hazards.

Chapter 2.7 should contain everything enabling a consignor to determine, without error, the correct classification of its radioactive consignment, and only that.

In this objective:

- *In compliance with TS-G-1.1 when, for a radionuclide, contribution of daughters as listed in footnotes (a) and (b) are taken into account, basic values given in table 2.7.7.2.1 for that radionuclide have to be compared with the proper activity of that radionuclide and not with the total activity of that radionuclide and its daughters (it means that proper activity of daughters listed in (a) or (b) shall be ignored). This shall be specified in 2.7.7.2 to avoid misinterpretation.*

Part 3

Dangerous goods list:

By the past, IAEA published schedules which were good helps for consignor to determine what have to be fulfil for a given type of package. These schedules have been recently deleted from the regulations at the great regret of the industry.

We proposed, at least, to reintroduce these schedules (or part of these schedules) as “packing instructions” in part 4 of the regulations and create the adequate links between the dangerous goods list and these packing instructions.

Add to LSA and SCO proper shipping names a new description “unpacked or packaged in type IP packages”, to avoid the use of these proper shipping names when these materials are shipped in type A, B(U), B(M) or C package.

For LSA-I (UN2912) and SCO-I (UN2913) which can be transported “unpacked” (see 4.1.9.2.3), instructions are missing: it is necessary to add a special instruction specifying that these materials can be shipped unpacked under the conditions specified in 4.1.9.2.3. (or 4.3.2.5).

Special provision 325 (if UF6, then UN2978 has to be used) shall also be applicable to UN2916, UN2917, UN2919 and UN3323.

Special provision 326 (if UF6, then UN2977 has to be used) shall also be applicable to UN3328, UN3329, UN3330 and UN3331.

Considering the definition of LSA-III (UN3322), which excludes liquids and powders, instructions T5 and provisions TP4 for portable tanks are inappropriate, and should be deleted (at least the possibility to use L2.65CN shall be removed).

Special provisions:

Special provision 172 should be limited to packages containing subsidiary risk material in excess of the allowable limited quantities for that subsidiary risk. Is there a need to determine the packing group for the predominant subsidiary risk? This is not required for other dangerous goods having subsidiary risks! (see 5.4.1.4.1 (d)).

Special provision 290 shall be modified if the proposal concerning precedence of classes made above is accepted.

Special provisions 325 and 326 should be limited to the cases where the quantity of UF6 is in excess of 0.1 kg per package.

Proposals for part 4

These items should be introduced in 4.1.9:

- packing instructions (at least 1 for each type of package).

Text of 4.1.9.1.5 is not really fully followed for current approved packages. For example, uranium hexafluoride, which have a class 8 subsidiary risk, shall be packed in packagings as required in chapter 6.4.6. Unfortunately, requirements made in 6.4.6 avoid the possibility to fully comply with the requirements made for class 8 packagings, IBCs or tanks in relevant chapters of part 6 (6.1, 6.5, 6.7 or 6.8) and 4.

This kind of situation is not an exception. There are a lot of type B(U) or B(M) of Fissile packages for which the approvals allow the shipment of goods having other dangerous properties, without the evidence that the specified packagings fully comply with the relevant chapters of parts 6 and 4 applicable for packagings, IBCs or tanks containing these dangerous materials.

The proposal to avoid these non-compliances, is to add at the end of paragraph 4.1.9.1.5 this sentence: “For approved package types, when necessary, alternative dispositions may be adopted, provided that these dispositions procure at least the same level of safety and are acceptable to the competent authority.”

Proposals for part 6

Text of 6.4.7.16 (b) should better be in part 4, within the adequate “package instruction” (Type A designed to contain liquid radioactive material).

Proposals for part 7

Concerning the level of permitted contamination of conveyances and equipments, there is a discrepancy between the level under which they shall be decontaminated after being contaminated (see 7.1.8.5.4 which require to be at the level specified in 4.1.9.1.2), and the definition of contamination under which non radioactive object are not included in Class 7 (see 2.7.1.2 (f)).

As these two paragraphs are written, we should consider that vehicles, large freight containers, wagons, which have been decontaminated as required in 7.1.8.5.4 may have to be classified as class 7 objects. This could cause a very complicated situation.

The proposal is to reserve the paragraph 7.1.8.5.4 to conveyances and equipments dedicated to the transport of radioactive materials, and to add a new paragraph for conveyances and equipments not dedicated to class 7 shipments: “Except as provided in 7.1.8.5.4 and 7.1.8.5.5, conveyance, or equipments, which have become contaminated above the limits set out in the definition for “contamination” in 2.7.2, shall be decontaminated to comply with these limits prior to be release for other uses.”
