

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

21 June 2012

Forty-first session

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Item 7 of the provisional agenda

Cooperation with the International Atomic Energy Agency

UF6 Samples

Transmitted by the International Atomic Energy Agency

Background

1. There are two existing UN numbers for UF₆ in quantities over 100g, UN 2977 and UN 2978. The Table entries for these identify the class as 7 with a subsidiary risk of 8. Limited and excepted quantity entries are 0 and E0 respectively. Both entries point to chapter 2.7 and section 4.1.9. In addition UN 2978 lists SP 317.
2. One point is that UN 2977 and UN 2978 do not show any UN packing group entry. The reason for this dates back to an original decision to deal with the complete provisions for Uranium Hexafluoride through provisions developed at IAEA. These provisions include the requirement to meet an ISO standard, and testing requirements which take into account all of the hazardous properties of the material.
3. The 100g cut off was originally chosen as a value below which there was no significant concern from release of the material. At this point the IAEA requirements simply specified the requirements necessary for the radioactive properties. There is no specific indication in IAEA documents related to the other hazardous properties – just the generic advice to take into account the requirements specified elsewhere (i.e. the UN Orange Book).
4. There has been some confusion over how to treat small samples of UF₆ in quantities under 100g. The proposal in ST/SG/AC.10/C.3/2011/46 was intended to clarify the situation; UF₆ is currently transported in quantities less than 100g; there was no intention of changing the requirements for packing and labelling, simply to clarify them by addressing them through a separate UN number. In particular, the requirements for subsidiary risks need to be included for this new UN number (i.e. the packing group).
5. There is no reason to treat the material significantly differently to the existing UF₆ – what is sought is clarity of provisions. There are three specific issues:
 1. SP 290 is important for small quantities of radioactive material.
 2. The packaging provisions for UF₆ need to be clear and suitable for all hazardous properties.
 3. The marking, labelling and documentation provisions need to be clear.
6. An initial proposal was developed by Member State representatives to IAEA with two options. This was revised to a single option prior to the last UNECE meeting. During the meeting some issues were identified that required resolution. As a result all text except for the UN number and proper shipping name were placed in square brackets.

Actions since last meeting

7. Following this meeting the text of the IAEA transport regulations has been distributed to Member States for comment – and no comment on the provisions of UF6 have been received. It is important to note that comments were invited from Member States, not just from Class 7 experts.

8. In addition the IAEA secretariat has invited feedback from Class 7 experts by email, and has had limited feedback on how to resolve the issues. The IAEA secretariat, while able to propose concepts for discussion, is unable to produce definitive proposals in conflict with MS decisions. As a result, while the IAEA secretariat wishes to propose revised text taking into account all of the input to date there have been no meetings of class 7 experts to date where this revised text could be endorsed by class 7 experts.

9. The proposal takes into account the important point that the primary safety for the packaging is provided through the application of the appropriate packing group, and thus the prime issue is clearly the Class 8 requirements. To have a package primarily tested and marked in relation to Class 8 and labelled as Class 7 could result in significant issues (not least enforcement issues where the regulatory responsibilities are separated by Class).

10. In order to progress the subject the IAEA secretariat invites the committee to accept the attached revised proposal to the UNECE with progress (and improve) the proposal as much as possible, with the aim of presenting the revised text to class 7 experts immediately following this meeting for endorsement. Any subsequent minor corrections requested will be forwarded to the December meeting of UNECE.

11. Should there be significant disagreement between Class 7 experts and UNECE experts the IAEA proposes an intercessional working group with the mandate to resolve differences and produce a consensus view of the necessary requirements for the December meeting. The committee is invited to agree to the setting up of this group if necessary.

Labels for excepted packages

12. The first issue identified by the UNECE meeting was the fact that excepted packages do not require a class 7 label. However, it should be noted that for air transport a non-standard label is required by IATA and ICAO. In order to avoid confusion the provisions of SP 290 take this into account. While the provisions of SP 290 may benefit from improvement this also relates to other issues such as the use of EQ and LQ for radioactive material. On reflection this seems to be a more significant issue than can be dealt with in the current biennium.

13. The IAEA secretariat believes that current proposals for UF6 samples should remain consistent with current principles, with a goal of dealing with the more significant issue of reviewing the principles in the next revision of the requirements. The issue to be investigated includes the use of EQ and LQ for radioactive material, the appropriate marking and labelling of excepted packages and the need to revise SP 290 to take this into consideration.

14. The committee are invited to note the proposed work plan set out by the IAEA secretariat, and invited to participate in the work programme as a joint project over the next biennium.

15. The committee are further invited to note that this future work is likely to introduce changes to all excepted packages in a consistent manner, including those being considered under UN 3507.

16. The committee are invited to agree with the IAEA Secretariat proposal that the UF6 sample proposal should remain consistent with current principles.

UF6 sample requirements - labelling

17. For the purpose of the UF6 sample proposal, it is proposed that the current practice set out in SP 290 is also utilised for UF6 excepted packages in order to ensure consistency. In order to achieve this purpose the introduction of a special provision allowing the use of labels specific and required in air mode needs to be introduced.

18. The end result would be a label for class 8 only being applied. This is consistent with current practice.

19. The committee are invited to agree with the IAEA Secretariat proposal that the current practice for labelling should be clarified by applying Class 8 labels.

UF6 sample requirements – subsidiary risk

20. A further issue raised in UN/SCETDG/40/INF. 36 concerned the potential addition of Class 6.1 as a subsidiary risk (we understand primarily related to the heavy metal properties of Uranium following chemical transformation to another substance) to this UN number. The proposal has significant implications for other materials (for example the other two UF6 related UN numbers, or for depleted Uranium munitions), the effects of which are not fully considered.

21. Initial investigation by the IAEA secretariat has identified a paper by WHO noting that toxic sensitivity to UF6 varies significantly with species, and that animal testing does not necessarily relate to human sensitivity. Indeed, while the paper notes significant sensitivity in rabbits it points to no evidence of toxic effects in humans.

22. The IAEA Secretariat believes the proposal for consideration of Class 6.1 is not appropriate to take forward at this time, but agrees that it warrants consideration.

UF6 sample requirements – packing group

23. The application of packing group would seem to be the area where there is most uncertainty in current practice. Some current practice is to make use of packages tested as PG II, and then retested for UF6 samples. It is considered that this is not clearly consistent with the current requirements for these samples, and that the requirement should clearly state that PG I is required, ensuring appropriate testing for the specified contents.

24. The committee are invited to agree that PG I is required for this material.

Overall proposal

25. The attached annex sets out this revision to the output of the last meeting by amending the table entry to be Class 8.

Annex

Proposed text.

Chapter 1.5

†1.5.1.5.1 At the end of the introductory sentence, before (a), insert ", except for UN 3507, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE – URANIUM HEXAFLUORIDE, where the additional requirements of special provision 369 of Chapter 3.3 shall be met". †

Chapter 2.0

†2.0.3.2 Amend the last sentence to read as follows:

"For radioactive material in excepted packages, except for UN 3507, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE – URANIUM HEXAFLUORIDE, special provision 290 of chapter 3.3 applies." †

Chapter 2.7

Table 2.7.2.1.1, under "Excepted packages" add the following new entry:

"UN 3507 RADIOACTIVE MATERIAL, EXCEPTED PACKAGE – URANIUM HEXAFLUORIDE, less than 0.1 kg per package, non-fissile or fissile-excepted".

†Table 2.7.2.1.1, under "uranium hexafluoride", add the following note at the end:

"NOTE: For uranium hexafluoride in excepted packages see UN 3507 under excepted packages." †

†2.7.2.4.1.1 Amend to read as follows:

"2.7.2.4.1.1 Packages may be classified as excepted packages if:

- (a) They are empty packages having contained radioactive material;
- (b) They contain instruments or articles in limited quantities as specified in Table 2.7.2.4.1.2;
- (c) They contain articles manufactured of natural uranium, depleted uranium or natural thorium;
- (d) They contain radioactive material in limited quantities as specified in Table 2.7.2.4.1.2; or
- (e) They contain less than 0.1 kg of uranium hexafluoride not exceeding the activity limits specified in column 4 of Table 2.7.2.4.1.2." †

†Add a new 2.7.2.4.1.7 to read as follows:

"2.7.2.4.1.7 Uranium hexafluoride not exceeding the limits specified in column 4 of Table 2.7.2.4.1.2 may be classified under UN 3507 RADIOACTIVE MATERIAL, EXCEPTED PACKAGE – URANIUM HEXAFLUORIDE, less than 0.1 kg per package, non-fissile or fissile-excepted, provided that the conditions of 2.7.2.4.1.4 (a)–(b) are met." †

†2.7.2.4.5 Amend to read as follows:

"2.7.2.4.5 *Classification of uranium hexafluoride*

2.7.2.4.5.1 Uranium hexafluoride shall only be assigned to:

- (a) UN No 2977, RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, FISSILE;
- (b) UN No 2978, RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, non-fissile or fissile-excepted; or
- (c) UN No 3507, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE – URANIUM HEXAFLUORIDE, less than 0.1 kg per package, non-fissile or fissile-excepted, in the case of uranium hexafluoride in quantities of less than 0.1 kg packaged and in an excepted package.

2.7.2.4.5.2 The contents of a package containing uranium hexafluoride shall comply with the following requirements:

- (a) For UN Nos 2977 and 2978, the mass of uranium hexafluoride shall not be different from that allowed for the package design, and for UN 3507, the mass of uranium hexafluoride shall be less than 0.1 kg;
- (b) The mass of uranium hexafluoride shall not be 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; and
- (c) The uranium hexafluoride shall be in solid form and the internal pressure shall not be above atmospheric pressure when presented for transport." } }

Chapter 3.2, Dangerous goods list

[For UN 2910 Delete "325" and insert "368" in column (6).]

Add the following new entry:

UN No.	Name and description	Class	Subsidiary risk	PG	SP	Limited Quantity	Excepted Quantity	Packing Instruction
3507	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - URANIUM HEXAFLUORIDE, less than 0.1 kg per package, non-fissile or fissile-excepted	[8]	[7] []		[317] [369]	[0]	[E0]	[P701]

Chapter 3.3

Add the following new special provisions:

f"368 In the case of non-fissile or fissile-excepted uranium hexafluoride, the material shall be classified under UN 3507 or UN 2978." }

f"369 Notwithstanding the provisions of 5.1.5.4.2 and in addition to the provisions of 1.5.1.5, the marking labelling and documentation requirements appropriate to Class 8 shall be applied, and in particular the following requirements of Part 5 shall be applied:

- (1) The package shall be marked in accordance with 5.2.1 and labelled with labels of models ~~[7A]~~, [8] ~~and 6.1~~ in accordance with Chapter 5.2;
- (2) For documentation, the requirements of 5.4.1.1 to 5.4.1.4; 5.4.1.5.1; 5.4.1.6; and 5.4.2 to 5.4.4 shall apply. The description in the transport document according to

5.4.1.4.1 shall be UN 3507 RADIOACTIVE MATERIAL, EXCEPTED PACKAGE, URANIUM HEXAFLUORIDE, ~~7[(8)][(6.1)]~~.

Chapter 4.1

4.1.4.1 Add the following new packing instruction:

†

P701	PACKING INSTRUCTION	P701
This instruction applies to UN 3507.		
<p>The following packagings are authorized provided that the general provisions of 4.1.1 and 4.1.3 and the special packing provisions of 4.1.9 applicable to excepted packages for radioactive material are met:</p> <p>Combination packagings consisting of:</p> <p>(a) Metal or plastic primary receptacle(s);</p> <p>(b) Leakproof rigid secondary packaging(s)</p> <p>(c) A rigid outer packaging:</p> <p>Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G);</p> <p>Boxes (4A, 4B, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2);</p> <p>Jerricans (3A2, 3B2, 3H2).</p> <p>The following requirements shall be met:</p> <p>(1) Primary receptacles shall be packed in secondary packagings in a way that, under normal conditions of transport, they cannot break, be punctured or leak their contents into the secondary packaging. Secondary packagings shall be secured in outer packagings with suitable cushioning material to prevent movement. If multiple primary receptacles are placed in a single secondary packaging, they shall be either individually wrapped or separated so as to prevent contact between them;</p> <p>(2) The combination packaging shall conform to the packing group 1 performance level;</p> <p>(3) The mass of uranium hexafluoride shall not be 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;</p> <p>(4) The uranium hexafluoride shall be in solid form and the internal pressure shall not be above atmospheric pressure when presented for transport;</p> <p>(5) The total quantity of uranium hexafluoride per package shall be less than 0.1 kg;</p> <p>(6) In the case of fissile material, limits specified in 2.7.2.3.5 and 6.4.11.2 shall be met.</p>		