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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Item 7 of the provisional agenda

MISCELLANEOUS PROPOSALS OF AMENDMENTS TO THE MODEL REGULATIONS OF THE TRANSPORT OF DANGEROUS GOODS

Classification of Mixtures and Solutions

Transmitted by the experts from the Unites States of America

Background

1.1 During it's 33rd session, the Sub-Committee considered UN/SCETDG/33/INF.16, submitted by the ICAO Secretary on behalf of the ICAO Dangerous Goods Panel (ICAO DGP), which addressed provisions for the classification of mixtures and solutions. While INF.16 contained no proposals, the paper did suggest that the Sub-Committee consider the issue and determine whether any amendments to the provisions of the Model Regulations were necessary to address the concerns raised by the ICAO DGP.

1.2 As a result of INF.16, a correspondence group was established to consider the Model Regulations' provisions applicable to the classification of mixtures of several dangerous substances or containing traces of dangerous substances. Terms of reference for the correspondence group were agreed to and published in Annex 3 of the Sub-Committee report (ST/SG/AC.10/C.3/66). The expert from the United States agreed to facilitate the correspondence group and subsequently distributed an initial request for comment and proposed timetable on August 18, 2008. The comments received were then consolidated and a first discussion document was later distributed outlining two proposals based on the feedback received. The Annex to this document contains the contents of the first discussion document. This paper presents the resulting suggestions from the efforts of the correspondence group for consideration by the Sub-Committee.

1.3 The correspondence group did not express a clear consensus on a definitive solution to the problems raised by INF.16. While some participants felt interim progress could be made with minor amendments at this session, others believed the issue required more extensive work into the next biennium. The following proposals representing the work of the correspondence group are submitted to the Sub-Committee for consideration. It is recognized that the issue is complex

and will not be completely resolved at this session. Therefore, it is suggested that the Sub-Committee convene an informal working group at the present session to discuss the need for further work and a potential way forward on this issue in the next biennium.

Proposal 1

1.4 These proposals include incorporating the terms “mixture” and “substance” as defined in GHS within the Model Regulations, and amending the text of the Model Regulations to clarify how to select an appropriate name and description based on the properties of the mixture or solution in question. It is proposed that the terms “mixture” and “substance” as defined in GHS be incorporated within Chapter 1.2 of the Model Regulations. It is recognized that the Sub-Committee may need to review these definitions to ensure appropriate application within the Model Regulations.

Mixture — Means a mixture or solution composed of two or more substances in which they do not react

Substance — Means chemical elements and their compounds in the natural state or obtained by any production process, including any additive necessary to preserve the stability of the product and any impurities deriving from the process used, but excluding any solvent which may be separated without affecting the stability of the substance or changing its composition.

1.5 It is proposed that the Sub-Committee consider the following revisions to Chapter 3.1.3 of the Model Regulations:

3.1.3 Mixtures or Solutions

3.1.3.1 A mixture or solution is not subject to these Regulations if the characteristics, properties, form or physical state of the mixture or solution are such that it does not meet the criteria, including human experience criteria, for inclusion in any class.

3.1.3.2 A mixture or solution composed of a single predominant substance identified by name in the Dangerous Goods List and one or more substances not subject to these Regulations and/or traces of one or more substances identified by name in the Dangerous Goods List, shall be assigned the UN number and proper shipping name of the predominant substance named in the Dangerous Goods List unless:

(a) The mixture or solution is identified by name in the Dangerous Goods List;

(b) The shipping name of the substance named in the Dangerous Goods List specifically indicates that it applies only to the pure substance;

(c) The class, subsidiary risk, physical state or packing group of the mixture or solution is different from that of the substance named in the Dangerous Goods List; or

(d) The characteristics and properties of the mixture or solution necessitate emergency response measures that are different from those required for the substance identified by name in the Dangerous Goods List.

3.1.3.2.1 Qualifying words such as "MIXTURE" or "SOLUTION", as appropriate, shall be added as part of the proper shipping name, for example, "ACETONE SOLUTION". In addition, the concentration of the mixture or solution may also be indicated after the basic description of the mixture or solution, for example, "ACETONE 75% SOLUTION".

3.1.3.3 A mixture or solution that is not identified by name in the Dangerous Goods List and that is composed of two or more dangerous goods shall be assigned to a description that has the shipping name, class, subsidiary risk and packing group that most precisely describe the mixture or solution.

Proposal 2

1.6 This proposal represents the opinion that there was not sufficient time to develop a complete solution to this problem and it would be preferable to defer any substantial amendments to the Model Regulations into the next biennium. However, in the interim it would be helpful to provide guidance material to assist the consignor in the correct assignment of a proper shipping name specifically for mixtures or solutions containing two or more dangerous goods. An approach similar to that taken by the ICAO DGP was suggested.

1.7 Add a note under paragraph 3.1.3.3 to read:

Note: Classification of mixtures or solutions containing two or more dangerous goods should be based on the properties of the mixture or solution, not the individual substances. In some instances, it may be appropriate to select the UN Number of a substance specifically listed by name in the Dangerous Goods List. For example, it may be more appropriate for mixtures or solutions containing a substance specifically listed by name in the Dangerous Goods List and traces or small quantities of one or more other dangerous goods to be assigned the UN number and proper shipping name of the predominant substance.

Proposal 3

1.8 Recognizing more extensive work is required on this issue, make no amendments to the Model Regulations at this session. The work of the correspondence group and of the informal working group if held at this session should be placed on the program of work for the next biennium.

ANNEX

Correspondence Working Group – On the Classification of Mixtures
First Discussion Document, October 2008

1. Introduction

A correspondence group led by the expert from the United States was established as a result of discussions held at the 33rd session of the UN Sub-Committee of Experts to address concerns raised in UN/SCETDG/33/INF.16 from ICAO. The Sub-Committee agreed to consider the UN Model Regulations' (UN MR) provisions applicable to the classification of mixtures of several dangerous substances or containing traces of dangerous substances. Terms of reference for the correspondence group were agreed to and published in Annex 3 of the Sub-Committee report (ST/SG/AC.10/C.3/66).

2. The Issues

The expert from the United States distributed an initial request for comment and proposed timetable on August 18, 2008. The initial request for comment suggested that due to the limited time available that the correspondence group focus their attention on the first two items within the agreed upon Terms of Reference (TOR). Therefore, the comments received only addressed items 1 and 2 of the TOR.

There was no consensus on a single solution to address the issue presented to the Sub-Committee. Therefore, this paper seeks to build on the range of suggestions presented in order to facilitate further discussion. The following observations were provided:

(a) Definitions. The comments received by participants indicated agreement that specific areas of the classification process could be improved through the adoption of two definitions from the GHS. Specifically, participants commented that the terms "mixture" and "substance" are used throughout the UN MR, but are not defined. Therefore, it was suggested to incorporate the GHS definitions for mixture and substance into Chapter 1.2 of the UN MR.

(b) Description selection. The comments reflected the opinion that the current guidance could be improved through a practical approach that addresses the various situations that occur when selecting the appropriate description for a mixture or solution. The different situations that could occur when determining the appropriate shipping description and indicating a technical name for mixtures include:

- Mixtures or solutions that contain one or more dangerous substances but that as a mixture or solution do not meet the criteria for inclusion in any hazard class or division.

Mixtures or solutions of one or more substances are not subject to the UN MR if the characteristics, properties, form or physical state of the mixture or solution are such that it does not meet the criteria, including human experience criteria, for inclusion in any class. For example, a Division 6.1, Packing Group III solid that is listed by name in the Dangerous Goods List but that is mixed with a quantity of another non-dangerous substance such that the mixture or solution no longer meets the criteria for classification in Division 6.1 or any other class (note that this is currently addressed to some extent in 2.0.2.7).

- Mixtures or solutions containing a single predominant dangerous substance and either non-dangerous substances that are not dangerous goods or trace amounts of other dangerous substances which do not affect the hazard characteristics of the mixture or solution.

  Mixtures or solutions composed of a single substance listed in the Dangerous Goods List and either one or more substances not subject to the UN MR, or trace amounts of one or more substances that are named in the Dangerous Goods List or that meet the criteria for classification as dangerous goods but do not contribute to the hazard characteristics of the mixture or solution (either primary or subsidiary).

- Mixtures or solutions of two or more dangerous substances in different hazard classes whose hazard characteristics only depend on one component of the mixture or solution.

  Mixtures or solutions of two or more dangerous substances in different hazard classes or divisions, that are named in the Dangerous Goods List or that meet the criteria for classification as dangerous goods, but the mixture or solution of which displays the hazard characteristics of only one of the components (e.g., a mixture of Class 8 solid substance and a Division 4.1 (readily combustible) solid substance for which, although the Division 4.1 substance is present in greater than a small or trace quantity, the mixture itself does not meet the criteria for Division 4.1. This question is also particularly relevant in terms of mixtures of gases of different divisions (e.g., a mixture of a Division 2.2 and a Division 2.3 gas, but which does not meet the criteria for classification in Division 2.3). In particular, in such circumstances should an N.O.S. entry be used to describe the mixture, and if so, must the technical name of the component not contributing to the class, division, or subsidiary risk be included?

- Mixtures or solutions composed of two or more similarly classed dangerous substances.

  Mixtures or solutions of substances (named or unnamed in the Dangerous Goods List) of the same hazard class or division. For example, for mixtures or solutions of two or more Class 3 substances; are there circumstances where the

mixture or solution should be described by the name of only one component listed by name in the Dangerous Goods List rather than by an N.O.S. entry?

(c) Trace amounts. It is recognized that commercial products contain added ingredients, or impurities which may or may not have an affect on classification. It is difficult to define what is meant by "trace" amount without using cut-off values or concentration limits. However, there is not a consistent application of these values or limits since in some cases trace amounts of a material within a mixture or solution may affect the classification and in other cases they may not. As an alternative to referring to trace amounts, it may be appropriate to base the classification decision and indication of a technical name on whether or not a component of the mixture affects the hazard characteristic (primary or subsidiary risk) of the mixture or solution, not on a set quantity in which the component material is present or by referring to it as a trace quantity in the classification procedures.

3. Suggestions for Further Discussion

As a means to facilitate further discussion, the comments received have been consolidated into two proposed amendments.

a) Proposal 1. Incorporate the terms "mixture" and "substance" as defined in GHS (item 2 of the TOR). It was recognized that the Sub-Committee may need to review these definitions to ensure appropriate application within the UN MR.

Mixture Means a mixture or solution composed of two or more substances in which they do not react

Substance Means chemical elements and their compounds in the natural state or obtained by any production process, including any additive necessary to preserve the stability of the product and any impurities deriving from the process used, but excluding any solvent which may be separated without affecting the stability of the substance or changing its composition

b) Proposal 2. The expert from the United States distributed an initial thought starter document that included proposed text for the UN MR paragraph 3.1.3 to address item 1 of the TOR. These options were based on proposals in INF.16 and proposals submitted to ICAO for an ad hoc working group on this issue. Of the two options presented in that initial document, the more comprehensive text provided in option 2 was preferred with additional enhancements suggested. The following incorporates a consolidation of the comments offered:

3.1.3 Mixtures or Solutions

3.1.3.1 A mixture or solution is not subject to these Regulations if the characteristics, properties, form or physical state of the mixture or solution are such that it does not meet the criteria, including human experience criteria, for inclusion in any class.

3.1.3.2 A mixture or solution composed of a single predominant substance identified by name in the Dangerous Goods List and one or more substances not subject to these Regulations and/or traces of one or more substances identified by name in the Dangerous Goods List, shall be assigned the UN number and proper shipping name of the predominant substance named in the Dangerous Goods List unless:

(a) The mixture or solution is identified by name in the Dangerous Goods List;

(b) The shipping name of the substance named in the Dangerous Goods List specifically indicates that it applies only to the pure substance;

(c) The class, subsidiary risk, physical state or packing group of the mixture or solution is different from that of the substance named in the Dangerous Goods List; or

(d) The characteristics and properties of the mixture or solution necessitate emergency response measures that are different from those required for the substance identified by name in the Dangerous Goods List.

~~3.1.3.2.1~~3.1.3.2.2 Qualifying words such as "MIXTURE" or "SOLUTION", as appropriate, shall be added as part of the proper shipping name, for example, "ACETONE SOLUTION". In addition, the concentration of the mixture or solution may also be indicated after the basic description of the mixture or solution, for example, "ACETONE 75% SOLUTION".

~~3.1.3.3~~3.1.3.4 A mixture or solution that is not identified by name in the Dangerous Goods List and that is composed of two or more dangerous goods shall be assigned to a description that has the shipping name, class, subsidiary risk and packing group that most precisely describe the mixture or solution.

4. Conclusion

Members of the correspondence Working Group are invited to submit comments on this paper to the expert from the United States no later than November 12, 2008. The members are encouraged to consider the various points under paragraph 2 of this report and determine if the proposals under paragraph 3 of this report address these issues, if the text in paragraph 3 can be enhanced, or if a different approach is necessary. The expert from the United States will consolidate these comments and submit an information paper to the UNSCETDG to update the Sub-Committee on the progress made and propose an informal working group during the 34th Session to continue work on this issue.

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