

Harmonization of the United Nations Recommendations on the Transport of Dangerous
Goods, Model Regulations, and the IAEA Regulations for the Safe Transport of
Radioactive Material

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ABSTRACT

This paper explains how IAEA Regulations for the Safe Transport of Radioactive Material are reflected in the United Nations Recommendations on the Transport of Dangerous Goods, Model Regulations (UN Orange Book) and thereafter in the various legal instruments effectively regulating such transport based on the UN Orange Book. It suggests some reasons why inconsistencies occur between such instruments and the IAEA Regulations. Activities carried out internationally during the last IAEA revision cycle and the previous one to reduce inconsistencies are described, in particular the cooperation between TRANSSEC and the United Nations Sub-Committee of Experts on the Transport of Dangerous Goods (SCETDG) and their respective secretariats (secretariat of the IAEA and of the United Nations Economic Commission for Europe (UNECE)).

During past years, this cooperation has been significantly strengthened. New activities to improve harmonization and maintain it have been put in place and should lead to better understanding between the various experts and authorities involved and at the end, not only better harmonization but also better implementation.

The Class 7 provisions of the UN Orange Book (18th revised edition) have been brought in line with those of SSR-6, and those of the major international legal instruments regulating transport of radioactive material by specific modes of transport are currently being amended accordingly for application as from 1 January 2015, but a number of issues requiring further cooperation have been identified and would need to be addressed in future.-Continuous cooperation will be essential for further progress,

but this means not only cooperation between organizations, it means also improved communication and discussion between experts and authorities for the transport of radioactive material and all experts and authorities for the transport of dangerous goods in general for all modes of transport.

1 Introduction

There is a long history of harmonization of the United Nations Recommendations on the Transport of Dangerous Goods, Model Regulations, (UN Orange Book) and the IAEA Regulations for the Safety Transport of Radioactive Material (SSR-6). The harmonization process led in particular to a significant revision of the IAEA Regulations (TS-R-1 1996 Edition). After this revision, several consultancy meetings were held to discuss and identify residual harmonization issues.

The inconsistencies between the various international and national regulations relating to the transport of radioactive material may complicate the preparation and handling of shipments. Unnecessary inconsistencies between regulations applicable to a specific mode of transport (modal regulations), national regulations and even local port regulations are likely to decrease safety in the transport chain. They may also lead to denial of shipment of radioactive material.

TRANSSC 24 decided that the current process for the two year review cycle should be continued, and therefore a new review cycle started at the beginning of 2013. During this new cycle, it is possible that a further comprehensive review of the UN Orange Book and SSR-6 be organized. A working group at TRANSSC 25 made some recommendations related to SSR-6 in this respect.

The purpose of this paper is to promote harmonization between the international regulations, especially the UN Orange Book and SSR-6 and to suggest measures to avoid future inconsistencies. First, in section 2, some reasons for the occurrence of inconsistencies between the regulations are discussed in relation to the mechanism used in the United Nations system for developing transport of dangerous goods regulations. Section 3 describes past activities especially during the previous revision cycle, which led to encouraging results. Finally, the recommendations from TRANSSC or other meetings are summarized for further work.

2 Reasons for the occurrence of inconsistencies between the regulations

2.1 Why do inconsistencies sometimes happen between the international regulations?

Figure 1 explains the mechanism used in the United Nations system for developing

harmonized regulations for the transport of dangerous goods in general, including radioactive material. Although the mechanism is intended for harmonization, the number of different actors also explains why inconsistencies sometimes happen.

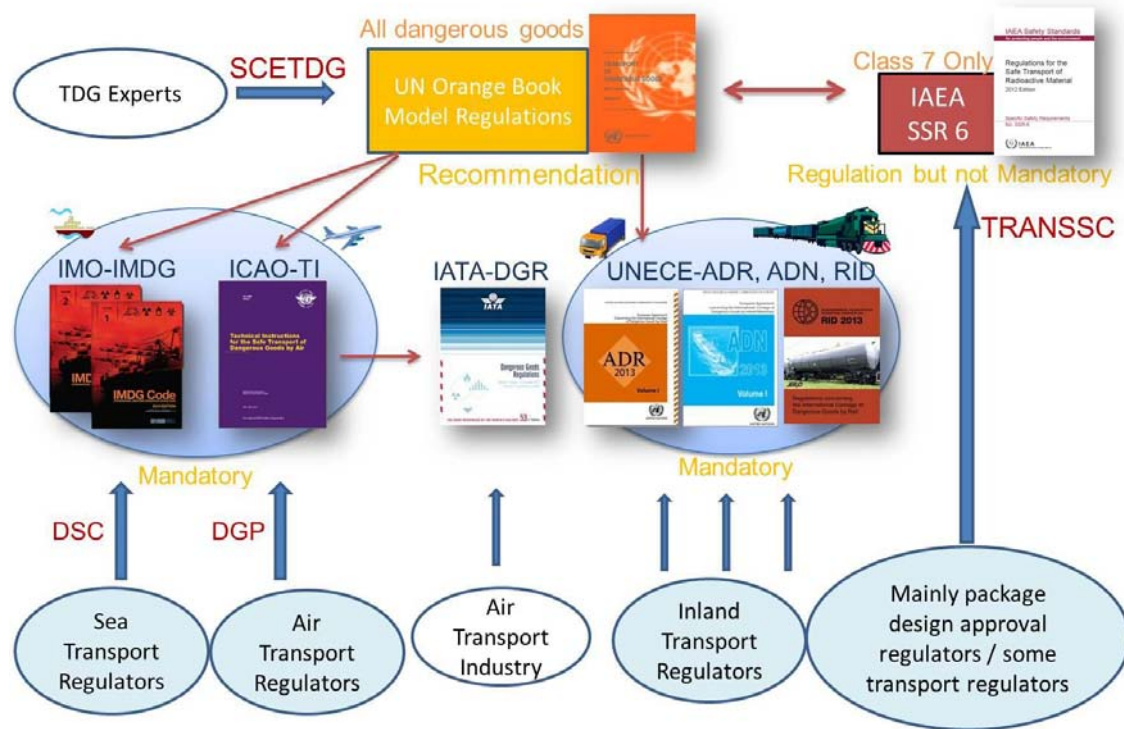


Fig. 1 Framework of regulations for the transport of dangerous goods

All these regulations are closely related but they are managed independently by intergovernmental bodies which are committed to cooperation but which remain the decision-making bodies for amendments to their respective legal instrument in accordance with their mandate. In addition, their decisions on amendments may be subject to final acceptance by higher bodies (e.g. CSS, 120 day comment procedure, board of governors in the case of TRANSSC) or by Contracting Parties in the case of international treaties such as SOLAS (IMDG Code) or ADR etc.

For SSR-6, the competent body is TRANSSC (Transport Safety Standards Committee), and is subject to IAEA procedures as mentioned above. For the UN Orange Book, the competent body is the United Nations Economic and Social Council (ECOSOC)'s Sub-Committee of Experts on the Transport of Dangerous Goods (SCETDG), for which secretariat services are provided by the United Nations Economic Commission for Europe.

ECOSOC is one of the six main organs of the United Nations, and has the power to co-ordinate the activities of UN specialized agencies such as the International Maritime

Organization (IMO) or the International Civil Aviation Organization (ICAO) or similar organizations such as IAEA, as well as to make recommendations to these organizations and to all UN Member States. This explains the particular importance of the UN Orange Book for harmonization of international and national regulations on the transport of dangerous goods.

In 1959, ECOSOC informed IAEA of its desire that IAEA be entrusted with the drafting of recommendations on the transport of radioactive substances, provided that they were consistent with the framework and general principles of the UN Orange Book and that they were established in consultation with the United Nations and the specialized agencies. Apart from SCETDG itself, the United Nations system bodies concerned are:

- For maritime transport: the IMO Sub-Committee on Dangerous Goods, Solid cargoes and Containers (DSC) and its Editorial and Technical Group for the International Maritime Dangerous Goods Code (IMDG code):
- For air transport, the ICAO Dangerous Goods Panel (DGP) for the Technical Instructions for the Safe Transport of Dangerous Goods by Air (ICAO TI).
- For inland transport (road, rail, inland waterways), the UNECE/OTIF RID/ADR/ADN Joint Meeting for provisions common to the three modes; and,
- For provisions specific to road transport in the European region and neighboring countries, the UNECE Working Party on the Transport of Dangerous Goods (European Agreement concerning the International Carriage of Dangerous Goods by Road)(ADR)
- For provisions specific to inland waterway, the UNECE ADN Safety Committee and Administrative Committee (European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways)(ADN)

Until the mid-1990s, IAEA developed and updated its Regulations rather independently, since the UN Orange Book contained only basic provisions for radioactive material, mainly the list of UN Numbers and entries and the labels that had been agreed in cooperation with IAEA and the general consignment procedures applicable to all dangerous goods. In the mid-1990s, it was decided that the UN Orange Book should be reformatted as “Model Regulations” in order to facilitate implementation through all international modal regulations and national regulations. The TRANSSC and SCETDG agreed to cooperate in order to include all provisions of the IAEA Regulations in these UN Model Regulations. The exercise showed that better cooperation between TRANSSC and SCETDG was necessary because after many

years the IAEA Regulations were no longer fully consistent with the framework and all general principles contained in the UN Orange Book. This meant that it was also sometimes difficult to incorporate in the modal regulations certain provisions of the IAEA Regulations which were inconsistent with those applicable to other dangerous goods.

As a result of the exercise, those provisions of the IAEA Regulations that are exclusively related to radioactive material have been fully integrated in the UN Orange Book, which is updated whenever the IAEA Regulations are amended. In parallel, TRANSSEC reviewed some provisions that were no longer consistent with those of the UN Orange Book and brought them up-to-date, and this enhanced cooperation has considerably improved harmonization, at least between the IAEA Regulations, UN Orange Book, and all UN system international regulations that are based on the UN Orange Book.

Nevertheless, another source of inconsistencies remains the fact that, despite the commitment of relevant organizations or departments of the UN system to apply the provisions of the UN Orange Book, the participants in each intergovernmental body concerned are not necessarily the same as those participating in TRANSSEC or SCETDG, and it happens that, as regulators for a specific mode of transport, they introduce deviations or additional provisions which are not always consistent with the IAEA Regulations or the UN Orange Book. When there is no appropriate coordination and internal discussion between stakeholders of different administrations at the national level, some delegations may try to introduce provisions that were not agreed with SSR-6 or the UN Orange book in the modal regulations. This is also a regrettable source of inconsistencies. For instance, there is no requirement for the segregation of packages of radioactive material from foodstuffs in SSR-6, but the IMDG Code contains such a requirement as a consequence of proposals from maritime authorities of IMO member States.

2.2 Why do inconsistencies sometimes happen between the countries?

IAEA has 158 member States, but its standards are not legally binding and there is no IAEA convention to make SSR-6 mandatory, although IAEA must use its standards for its own operations. Of course IAEA recommends that its Member States apply its standards, but in practice, it is only in international transport, through treaties such as SOLAS/IMDG Code, Chicago Convention/ICAO TI, ADR, ADN, COTIF/RID that the requirements contained in the IAEA Regulations become mandatory. For domestic traffic, countries may decide to fully apply, partially apply or not apply at all the IAEA

Regulations and there are indeed a variety of situations depending on the extent to which each country implements the IAEA Regulations through national law and updates its national regulations when the IAEA Regulations are amended. An exception is the case of countries of the European Union because they are bound by Directive 2008/68/EC to apply ADR, RID and ADN to domestic traffic.

Some inconsistencies may also occur between countries which apply international regulations. For example, IMO has 170 member States, and 162 of them are parties to the SOLAS Convention. Their fleet represents 99.20 % of the world tonnage at sea, which means that almost all international maritime transport operations involving dangerous goods in packaged form have to be performed in conformity with the IMDG Code. However, although SOLAS requires the mandatory application of the IMDG Code, the IMDG Code itself contains some provisions which are not intended to be mandatory, as indicated in paragraph 1.1.1.5:

“1.1.1.5 Although this Code is legally treated as a mandatory instrument under chapter VII of SOLAS 74, as amended, the following provisions of the Code remain recommendatory:

- .1 paragraph 1.1.1.8 (Notification of infringements);
- .2 paragraphs 1.3.1.4 to 1.3.1.7 (Training);
- .3 chapter 1.4 (Security provisions) except 1.4.1.1, which is mandatory;
- .4 section 2.1.0 of chapter 2.1 (Class 1 – Explosives, Introductory notes);
- .5 section 2.3.3 of chapter 2.3 (Determination of flashpoint);
- .6 columns (15) and (17) of the Dangerous Goods List in chapter 3.2;
- .7 The segregation flow chart and example in the annex to chapter 7.2
- .8 section 5.4.5 of chapter 5.4 (Multimodal Dangerous Goods Form), insofar as the layout of the form is concerned;
- .9 chapter 7.8 (Special provisions in the event of an incident and fire precautions involving dangerous goods);
- .10 section 7.9.3 (Contact information for the main designated national competent authorities); and
- .11 appendix B.”

In such instances, each country may decide to apply the provisions of the IMDG Code or to deviate from its provisions.

For international air transport, the Chicago Convention makes the application of the ICAO Technical Instructions mandatory in all 191 ICAO Member States. However it allows its Contracting States to adopt different provisions that must then be notified to ICAO which publishes them in the Technical Instructions. It also happens that

operators (e.g. IATA members) impose more restrictive conditions (e.g. as contained in the IATA Regulations), and the Chicago Convention recommends that such restrictions be also reported by Contracting States for publication in the ICAO TI. So in practice the ICAO TI also contains lists of deviations or additional restrictions per country and per operator, and quite a number of these restrictions concern radioactive material.

On the contrary, other treaties such as ADR do not allow Contracting Parties to impose on their territory, for reasons of safety during transport, additional restrictions on shipments/vehicles originating from other Contracting Parties. On the other hand, they allow Contracting Parties to conclude between themselves bilateral or multilateral agreements authorizing temporarily less stringent transport conditions provided safety is not compromised. These agreements are often used for advance application of future amendments, but they result de facto in inconsistencies between countries since, usually, they are signed by a limited number of countries. These derogations and signatory countries are communicated to all Contracting Parties and are made publicly available on the UNECE website.

3 Past activities and discussions

3.1 What was achieved during the previous revision cycle/previous biennium?

In the previous revision cycle (that led to SSR-6), some presentations about the interface between the UN Orange Book and SSR-6 (previously TS-R-1) were made for better understanding in TRANSSC 21 and 22. TRANSSC 23 approved a paper describing the process for future cooperation between TRANSSC and SCETDG. The paper confirmed the roles of SCETDG and TRANSSC as outlined in their respective terms of references, and proposed a plan of action for future introduction of provisions from the IAEA Regulations into the UN Orange Book and for TRANSSC review of changes proposed to the UN Orange Book. In summary:

1. With respect to TRANSSC input to SCETDG, the IAEA Secretariat will prepare proposed to the UN Model Regulations resulting from TRANSSC approved revisions to TS-R-1 and provide the proposed changes to the SCETDG by mid-March of even number years at the latest, keeping them informed throughout the process.

SCETDG will transpose these changes in the UN Model Regulations at its June session of even number years resulting in draft changes to the UN model Regulations to be checked by TRANSSEC at its autumn meeting in even number years before final adoption by SCETDG at its December session of even number years.

2. With respect to SCETDG work not specifically related to radioactive material but which may affect transport of radioactive material:

TRANSSEC members should ensure that a liaison system is established at the national level to make sure that they are made aware by their national SCETDG expert of any proposal submitted to SCETDG that might affect transport of radioactive material and that they are consulted in the process of defining the national position on such proposals.

The IAEA secretariat shall bring to the attention of TRANSSEC all SCETDG reports and adopted draft changes to the UN Model Regulations after each of the first three sessions of a SCETDG biennium, as well as any proposals to be discussed by SCETDG at its December session of even number years;

If such changes or proposals are likely to affect transport of radioactive material and there is a consensus at TRANSSEC level that such changes are not satisfactory in the context of transport of radioactive material, the IAEA secretariat shall provide the SCETDG with the consensus opinion of TRANSSEC before a final recommendation in this respect.

The IAEA Secretariat shall bring to the attention of TRANSSEC at its first (March) or second (fall) session of the year following the end of a SCETDG biennium session amendments finally incorporated in a new version of the UN Model Regulations for the purpose of aligning the IAEA regulations accordingly.

The IAEA Commission on Safety Standards (CSS) and Board of Governors approved the publication of SSR-6 2012 Edition in March 2012. In response, and in accordance with the procedure described above, the UNECE secretariat prepared a proposal for corresponding changes to the UN Orange Book as documents

ST/SG/AC.10/C.3/2012/58 and UN/SCETDG/41/INF.12 submitted to SCETDG 41 for consideration in July 2012. The IAEA Secretariat reviewed these documents in cooperation with the UNECE secretariat and quite a number of editorial issues could be resolved by e-mail. Through the review, some more substantial issues were identified and brought to the attention of SCETDG 41 by the IAEA secretariat as informal document UN/SCETDG/41/INF.65, as comments on ST/SG/AC.10/C.3/2012/58. The outcome of the discussions of SCETDG 41 was very soon presented at TRANSSEC 24 in July 2012, and then all participants were divided into three working groups. One of them discussed the classification of Uranium hexafluoride less than 100 g and the other two working groups reviewed all proposed changes to the UN Orange Book in the light of changes to SSR-6. The working groups found that some changes in SSR-6 were missing in the proposed changes to the UN Orange Book. Pursuant to these discussions, the UNECE and IAEA secretariats prepared a revised proposed list of changes to the UN Orange Book in document ST/SG/AC.10/C.3/2012/100 and informal document UN/SCETDG/42/INF.4 for consideration by SCETDG at the last session of its working biennium in December 2012, that was also submitted to TRANSSEC 25 in October/November 2012 for checking. TRANSSEC 25 also reviewed a number of documents that were to be discussed by SCETDG at its last session of the biennium:

- Uranium hexafluoride samples:
ST/SG/AC.10/C.3/2012/101 and UN/SCETDG/42/INF.7
- Lamps containing small amounts of dangerous substances:
ST/SG/AC.10/C.3/2012/76 and UN/SCETDG/42/INF.3
- Articles containing small quantities of dangerous goods:
ST/SG/AC.10/C.3/2012/77
- Neutron radiation detectors:
ST/SG/AC.10/C.3/2012/60
- Used medical devices:
ST/SG/AC.10/C.3/2012/92
- Marking/Labelling:
ST/SG/AC.10/C.3/2012/96

In addition, the following issues considered by SCETDG in the biennium were also reviewed:

- Pressure vessel versus pressure receptacle ;
- Assignment of SP 172 to UN 2977 and 2978;
- Marking size.

The comments made by TRANSSC 25 were brought to the attention of SCETDG in informal documents UN/SCETDG/42/INF.4/Rev.1, UN/SCETDG/42/INF.55, UN/SCETDG/42/INF.17 and UN/SCETDG/42/INF.70, were taken into account by SCETDG when adopting its final list of changes to the UN Orange Book (ST/SG/AC.10/40/Add.1) which are now reflected in the 18th revised edition of the UN Orange Book which, as a consequence, now matches SSR-6, and which is currently being used by all relevant international modal organization for their next version of modal regulations (IMDG Code, ICAO TI, ADR, RID, ADN) that should become applicable as from 1 January 2015.

3.2 What took place before the previous review cycle?

There had been a lot of efforts for harmonization between UNOB and SSR-6 (TS-R-1). The following list contains examples of CS meetings related to harmonization issues.

- 17-18 August 1998 CS-85: Consultants Service Meeting on Integrating the Agency's "Regulations for the Safe Transport of Radioactive Material" into the Regulations of other International Safety Organizations
- 27-28 March 2000 CS-43: Interagency Meeting on Integrating the International Atomic Energy Agency's "Regulations for the Safe Transport of Radioactive Material" into the Regulations of other International Transport Safety Organizations
- February 13-17, 2006 CS-27: Harmonization I; Consultants Service Meeting to Review the document ST/SG/AC.10/C.3/2005/19 "Harmonization With The International Atomic Energy Agency (IAEA) Regulations for the Safe Transport of Radioactive Material"
- 26 – 28 September 2007 "CS-72: Harmonization II; Consultant Service on Harmonization Between UN and IAEA Transport Regulations

The reports from the CS meetings were discussed by TRANSSC as well, which led to better harmonization in some areas such as tank requirements or transport document. There are, however, some recommendations on the development and integration of packing instructions for Class 7 material, or for considering the need to harmonize the structure of TS-R-1 with that of the UN Orange Book that are still pending.

3.3 What do we need to do for further harmonization?

There is a difference in the concept of the way to package material between the UN Orange Book and SSR-6. In the UN Orange Book, the consignor chooses the packaging in accordance with the packing instruction indicated for the relevant entry in

the Dangerous Goods List. On the other hand, SSR-6 provides criteria for the design of the package for radioactive material. The difference of the concept leads to confusion, as no specific type of packaging is prescribed in SSR-6 as long as the criteria are met, whilst in the UN Orange Book, in addition to design performance test criteria, the specific types of packagings that may be used are prescribed.

Sometimes there are also differences in the terminology used. Some terms were modified in SSR-6 or the UN Orange Book in the harmonization process, but there are still issues at stake, e.g. concept of management systems for radioactive material and concept of quality assurance for other dangerous goods.

Some other issues will need further consideration or clarification, in particular how to deal with radioactive material possessing other dangerous properties, which is addressed in the UN Orange Book (Special provisions 172 and 290) but not in detail in SSR-6, and it is not very clear whether all relevant requirements applicable due to these additional hazards are well complied with in practice. This issue came to light when discussing the classification of the new entry UN 3507 for Uranium Hexafluoride less than 100 g meeting the conditions for excepted packages. In accordance with the UN Orange Book principles, this radioactive material had to be classified in Class 8 (corrosives) and not Class 7, and not all TRANSSC members had realized that another class of dangerous goods could take precedence over class 7 when the RAM is excepted package containing material with other hazards.

The review of draft amendments to the UN Orange Book in detail and of some SCETDG documents by TRANSSC has proven to be useful for identifying some contradictions or possible improvements in both SSR-6 and the UN Orange Book.

To avoid unnecessary inconsistencies, further cooperation with modal regulators and stakeholders is needed. The secretariats often attend the other organizations committees and exchange information. In addition, inter-agency meetings are organized regularly to facilitate cooperation between secretariats. However, it may not be enough. One of the most important factors for harmonization is to ensure that all administrations concerned discuss cross-cutting issues at national level and share information before and after sessions of the intergovernmental bodies concerned. Participants in all these intergovernmental bodies need to know about the work and discussions of other committees.

The following recommendations for further work were made by the working groups of TRANSSC 25:

- Ch. 6.4.11.2 (and 6.4.11.3): the use of “excepted” versus “exempt” should be

reviewed.

- Ch. 6.4.23.11 (c): Is there a need for type code for basic nuclide value? (UNOB is in line with SSR6: issue for next review cycle).

The following recommendations were made by TM-44897

A. Harmonization SSR-6, UN and modal regulations

WG#3 recommends harmonizing the following items:

1. Difference of requirements for UN Packing groups and IAEA types of packages (eg. Industrial Packages)
2. Certification requirements for non-approved package designs
3. Primary and subsidiary risk (technical basis for criteria)
4. Limited quantity, Excepted quantity vs Excepted package
5. Transport of samples (UNOB 2.0.4)
6. Salvage packaging (UNOB 4.1.1.18, 6.1.5.1.11)
7. Expand emergency provisions with general mode-independent requirements (304, 305 and 554 (c) of SSR-6)
8. Assessment of special provisions of UNOB, applicable for radioactive material
9. Segregation requirements and guidance for persons (public and workers), para 562 of SSR-6

B. Harmonization between countries

WG#3 recommends examining the following items:

1. Reduce differences between the state regulations and international safety standards (eg. License vs certificate, approval)
2. Mutual recognition of approval of package design
3. Consider developing IAEA “package design safety report” guide as a possible standard
4. Support developing the international applicant review guide

4 Conclusion

The mechanisms of occurrence of inconsistencies were discussed in this paper and recent achievements in the harmonization process were reviewed, as well as recommendations for further discussions on various issues. Although the review shows that the activities in the previous cycle were effective for harmonization, the mechanisms of occurrence of inconsistencies shows that they are still likely to occur if the participants in various committees do not make efforts to communicate with the other transport regulators and stakeholders. Therefore it is important for TRANSSC representatives to discuss with the other experts on the transport of dangerous goods and

authorities when they decide on a national position or draft a proposal, and that communication goes both ways.

The IAEA has encouraged the establishment of a national network to deal with the issues of denial of shipments of radioactive material to identify lack of harmonization between regulations. Such a network may have a synergetic effect for harmonization between the international regulations or even in domestic regulations. Good knowledge of the current status of different regulations, and proactive participation in their revision by both countries and international organizations, would be a milestone in the desired objective of reaching harmonization.

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