Establishing a sustainable regulatory framework for the security of radioactive sources through harmonization with a safety regulatory framework

Adriana Baciu, Warren Stern, Sidra Zia
Brookhaven National Laboratory, Upton NY, USA
wstern@bnl.gov

1. Background and Goal of the present work

Regulating nuclear safety and nuclear security are national responsibilities. One challenge States face related to the regulation of radioactive sources is to integrate and harmonize their regulatory frameworks for safety and security, so that "security measures do not compromise safety and safety measures do not compromise security". In doing this, a thorough understanding of existing international recommendations in IAEA safety and security publications is required. There are common elements – such as concepts, principles, mechanisms, terms or functions – which are addressed in both safety and security publications, overlapping areas of interaction between safety and security, and specific topics which are unique for one or the other discipline.

The present paper is intended to support regulatory bodies and other stakeholders who are responsible for establishing or improving the security regulatory framework in harmonization with an existing safety regulatory framework. A comprehensive comparative analysis has been performed in order to identify those common elements and the differences in both sets of international recommendations (for safety and for security).

2. Sources for the comparative analysis

The sources used for the comparative analysis are the IAEA safety standards series and the nuclear security series publications dealing with the use, storage and transport of radioactive sources, radioactive material and associated facilities. In addition, the Code of Conduct on the Safety and Security of Radioactive Sources has been included in this analysis, as one important, well-accepted, non-legally binding international instrument.

3. Criteria have been defined to perform the comparative analysis and they are presented in Table 1

In the analysis, the international recommendations on safety and security have been divided into three categories: i) international recommendations at the State level; ii) international recommendations for the regulatory functions and processes, and iii) international recommendations for operators of facilities and activities involved in the use, storage and/or transport of radioactive sources and/or radioactive material. Main topics have been identified for each category and the below criteria have been applied in order to determine if the respective topic is addressed in both types of publications identically, in a similar or different way, or is a specific topic for either safety or security purposes.

Table 1. Criteria used for the comparative analysis.

No.		Criterion	Description
1	Common elements	Identical pattern	Identical description and use of the international recommendation in terms of form, content and objective as it applies to the same 'target'
2		Similar pattern	Similar description and use of the international recommendation in terms of form, content, and objective, but the 'target' is different, with one being related to safety and the other related to security; usually less coverage in security publications
3		Different pattern	Different description and/or use of same concept, principle, mechanism, term or function, due to safety/security specificity
4		Specific element	Concept, principle, mechanism, term or function is specific to either safety or security

4. Analysis

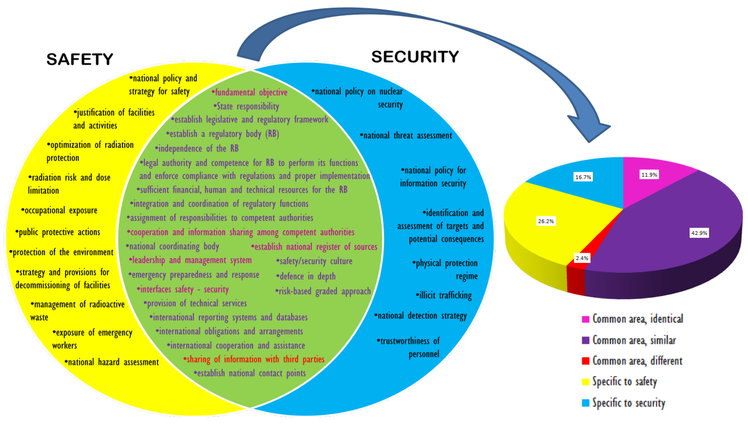

Figure 1. Common and specific elements for safety and security in international recommendations addressed at State level.

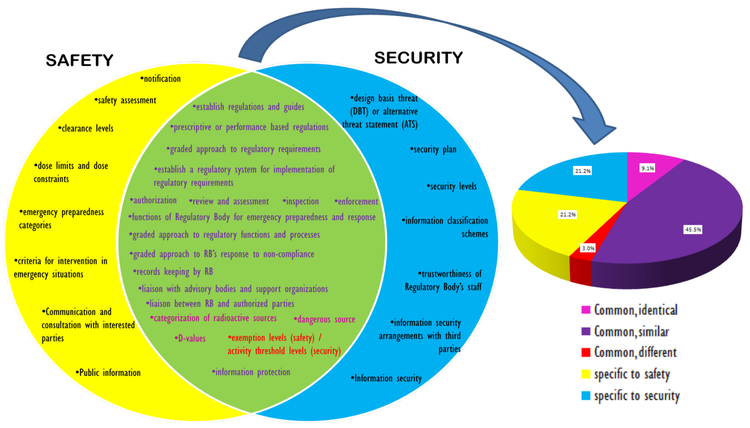

Figure 2. Common and specific elements for safety and security in international recommendations for regulatory functions and processes.

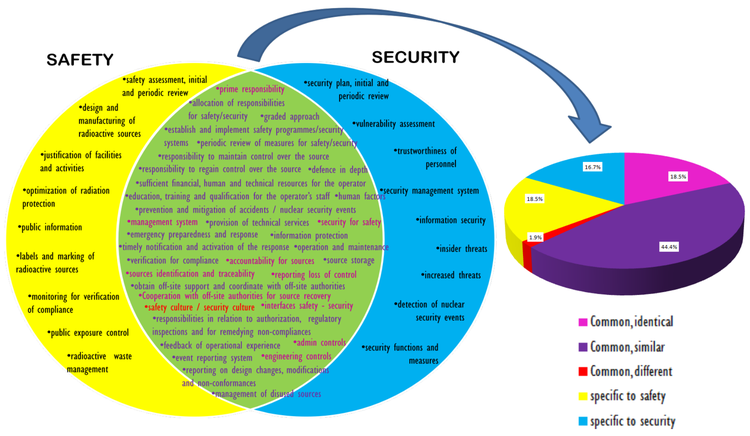

Figure 3. Common and specific elements for safety and security in international recommendations for operators of facilities and activities involving radioactive sources or material in use or storage.

4.1 International recommendations at *State level*

A number of international recommendations are included in both safety and security publications, which address the State level. Some of these recommendations are identical in form, content, and objective for both safety and security and have the same 'target', for example, the establishment of a national register of radioactive sources. However, other international recommendations are only similar, for example, the establishment of an independent regulatory body for safety and, respectively, for security. Some other international recommendations are specific either to safety (e.g. radiation risk and dose limitation) or to security (e.g. information security).

4.2. International recommendations for *regulatory functions and processes*

In this category, topics have been considered in relation to the regulatory functions and processes – elaboration of regulations and guides, authorization, review and assessment, inspection, enforcement, functions for emergency preparedness and response and communication and consultations with interested parties. The elements described identically for both safety and security are the concept of a dangerous radioactive source, the D-values and the categorization of radioactive sources. In addition, most of the international recommendations that address regulatory functions and processes follow a similar pattern in both safety and security publications.

4.3 International recommendations for *operators*

While the first two categories of international recommendations addressed in the paragraphs above are to be applied by States, competent authorities and regulatory bodies in relation to all facilities and activities, the third category of international recommendations, described in this section, is about regulatory requirements for operators of those facilities and activities involved in the use, storage and/or transport of radioactive sources and/or radioactive material. As shown in Figure 3, almost 20% of international recommendations are described and used identically in safety and security, and more than 40% follow a similar pattern.

5. Conclusions and Acknowledgements

- The analysis has shown the concrete elements and topics which are relevant for both safety and security and to the extent to which they are similar or different.
- The general conclusion is that for all categories, more than 40% are common recommendations, which are described and used in a similar way for safety and security. About 10% or more of the recommendations are addressed identically for a particular topic in both safety and security, while about 2% of common topics are used in different way, due to distinct features of the two disciplines.
- This data, along with the qualitative evaluation presented here, may help States to establish a regulatory infrastructure for the security of radioactive sources that complements a safety regulatory infrastructure. Additionally, it may assist in the more cohesive managing of the two infrastructures and their interfaces.

Poster Ref. Number: 260
International Conference on Nuclear Security: Sustaining and Strengthening Efforts, 10–14 February 2020, Vienna, Austria