Proceedings of the 19th International Symposium on the
Packaging and Transportation of Radioactive Materials
PATRAM 2019
August 4-9, 2019, New Orleans, LA, USA

PERSPECTIVES ON REGULATORY DESIGN AND DEVELOPMENT FOR TRANSPORT SECURITY OF NUCLEAR AND OTHER RADIOACTIVE MATERIALS

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ABSTRACT

The responsibility for nuclear security rests entirely with the State but the International Atomic Energy Agency (IAEA) recognizes that a cornerstone in the development of a nuclear security regime is the development of regulations that address security of nuclear material and other radioactive material in transport. While the IAEA provides recommendations and guidance for security of materials in transport through Nuclear Security Series (NSS) documents, the challenge of integrating those recommendations into a Member State's national legal framework is significant. Specifically, the development of transport security regulations requires coordination between both legal and technical experts within the country's competent authority and multiple governmental agencies, as well as input from transport operators and other stakeholders. In addition to these interactions, the regulations must reflect the legal traditions of the Member State to fit within its overall national legal framework. Recognizing the challenge, the IAEA has requested input from international legal and technical experts to develop a methodology for drafting regulations on transport security of nuclear material and other radioactive material. This paper discusses the progress made so far in developing the methodology and provides a perspective on the need for transport security regulations and the challenges associated with their development. Ultimately, the goal of this paper is to introduce

[2] The author would like to acknowledge the Office of Radiological Security (ORS) and the Office of International Nuclear Security (INS) within the National Nuclear Security Administration and the Department of Energy for their support in writing this paper.

the IAEA-proposed methodology and to facilitate the discussion of this methodology with Member States that need support in developing their transport security regulations.

INTRODUCTION

The responsibility for nuclear security rests entirely with the State, but for many years, the International Atomic Energy Agency (IAEA) assisted Member States (MS), at their request, in developing their domestic legal arrangements for regulating the peaceful uses of nuclear energy and ionizing radiation. In the area of nuclear security, the demand for legislative and regulatory assistance has increased dramatically over the past 10 years due to adoption of international instruments, namely the Convention on the Physical Protection of Nuclear Material (CPPNM) and its Amendment, the International Convention for the Suppression of Acts of Nuclear Terrorism (ICSANT), various United Nations Security Council Resolutions (UNSCR 1373 and 1540), and the Code of Conduct on the Safety and Security of Radioactive Sources.

To complement the IAEA handbook on Nuclear Law [1], the Agency issued Nuclear Security Series implementing guide No. 29-G, *Developing Regulations and Associated Administrated Measures for Nuclear Security* [2]. Based on the Nuclear Security Series publications and other IAEA guidance, competent authorities may use these documents to assist them in their obligations under international law and assist in discharging their responsibility for nuclear security within the State. Additionally, the Agency provides assistance that includes consultation with the goal of developing, maintaining, and implementing a regulatory framework to govern the nuclear regime, including the secure transport of nuclear and other radioactive materials.

To support regulatory development for transport security regulations for nuclear and other radioactive material, it became necessary to develop a methodology that reflects the complexity in regulatory development with the unique characteristics involved in transport. This methodology seeks to complement existing implementing guides and help IAEA experts in supporting Member States consistently in developing transport security regulations. This paper describes the challenges with developing transport security regulations, the methodology and tools developed by the Agency, and shares specific experiences and lessons learned from the efforts to develop transport security regulations in Burkina Faso.

CHALLENGES WITH DEVELOPING A TRANSPORT SECURITY REGULATION FOR NUCLEAR AND OTHER RADIOACTIVE MATERIAL

This section outlines the challenges in developing a transport security regulation for nuclear and other radioactive material. These range from systemic issues in use of terms and vocabulary of nuclear security, to lack of legal and technical experts for transport security, to specific challenges within a country's legislative and regulatory framework. Given the multi-modal, multijurisdictional, and multiple stakeholders involved in transport, the complexity increases exponentially. Within the context of international transport, the fundamental goal is a need for common requirements to ensure continuity of security along the route.

- *Adapting the Regulations to the National Situation and Needs of the Time*

Regulatory development for a country can be highly specific and should reflect various factors. Those factors include the national legal framework, including the establishment of competent authorities, and regulatory environments with older agencies and those agencies which may be created under the nuclear legal framework in the country. Aside from legal traditions, each country has different threat environments, cultural traditions, technical capacities, and financial and human resources. From a technical perspective, the regulatory requirements for transport security should be realistic and achievable given local conditions, while considering the economic impacts of the regulations on the nuclear transport industry.

States developing transport security regulations can look to other state's regulations for providing useful guidance on resolving issues in transport security regulatory development but should be careful. The lessons of one state may not be appropriate in the development process for another state. Previous experience also shows that the use of template or model regulations in nuclear transport security has limitations as the models may not be applicable or the methodology for development requires a toolbox of support rather than the temptation to "copy and paste" from the model regulations.

- *Challenge in defining the scope of the regulations*

Another challenge is to define in which regulations the transport security requirements should be established. A State may decide to create separate sets of regulations for different types of radioactive materials or topics. Alternatively, it may choose to develop a set of combined regulations covering all areas of nuclear security and/or nuclear safety. For instance, the scope of the regulations could be: Security (and safety) of radioactive material in use, storage and transport or, security of nuclear material and radioactive material in transport or, safety and security of radioactive material in transport. The scope should also clearly define the different modes of transport used within the country and consider the case of transit shipments where the material is shipped through a country that may even not have a nuclear industry program of its own.

- *Interfacing with Transport Safety Requirements*

The approach used for the drafting of transport security regulations for radioactive material differs to the approach usually used for the drafting of transport safety regulations, which is based on International Safety Standards [5]. When the transport safety regulations already exist in the country, a key challenge is to develop the transport security regulations without compromising the safety requirements. This often can be a challenge. For instance, the responsibility of the operators may differ in the two cases. According to the Transport Safety Standards, the main responsibility may be assigned to the shipper and the safety of the transported material relies notably on the design of the package. In transport security, the responsibility may be assigned to either the shipper or the carrier and the physical protection of the material relies on other technical features such as the robust design of the transport vehicle and the over pack, or the use of security escorts. The Competent Authority responsible for the development of the transport safety regulations of dangerous goods may also be different from the competent authority in charge of transport security.

- *Limited Human Resources in Developing Transport Security Regulations*

Developing transport security regulations for nuclear and other radioactive material requires expertise in both the legal, regulatory development processes within a given State and the technical expertise in transport security. While legal experts may be trained in Administrative Law or regulatory drafting, there are few experienced regulatory drafters of nuclear security regulations in developing countries. Furthermore, experts who draft nuclear transportation security regulations often do not have enough time to do the drafting as thoroughly as they would like. An expert who is given a drafting job is often also tasked with several other jobs by the competent authority.

LEGAL CONSIDERATIONS

The development of regulations within a given country largely depends on the cultural, legal, and institutional traditions of the country. Member States developing nuclear laws must consider multiple considerations. Included in these deliberations is the focus of the legislation (Safety, Security, Safeguards) for nuclear and other radioactive materials, their obligations under existing international treaties and conventions, the processes involved in using such material (licensing, authorization, enforcement, and penalties), and the covered activities (use, storage, and transport). As part of this process, the Nuclear Law may vest a new Competent Authority with responsibilities previously held by another agency or create new responsibilities all together. In transport, the creation of an independent Competent Authority which regulates transport security may in fact be splitting responsibilities between itself and a ministry of Transport or a ministry of Interior. In those cases, if an Enabling Statute creates a new Competent Authority within a country vested with responsibilities for nuclear security, including in transport, how does this agency interact with pre-existing agencies, such as a ministry for transport or ministry of interior? [3]. Furthermore, if existing regulations for transport exist for Class 7, how does the new nuclear Competent Authority develop regulations so as not to either conflict with existing regulations or create redundancy in regulations where they are acting *ultra vires* of their statutory mandate [3].

Outside the legal framework, a challenge to regulatory drafting for transport security is one of language, rather than process. In many languages, the word for "safety" and "security" are one in the same. For example, in Member States where Spanish is the language used for regulatory drafting, safety and security are both defined as "seguridad." For those Member States using IAEA guidance, the Safety Series guidance, SSR 6. (Rev.1) and the Nuclear Security Series (NSS) documents for Transport Security, NSS-9 (Rev. 1) for Transport Security of Radioactive Materials and NSS 26-G for Transport Security of Nuclear Materials, this could potentially create confusion over whether the regulation is safety focused or security focused [4][5][6]. As both safety and security speak to different concerns, this could prove problematic. However, Member States drafting security regulations where this could be an issue are adding modifier words to designate safety vs security. In the case of Spanish language countries, physical security is defined as "seguridad física" whereas safety is defined as "seguridad técnica."

Of equal importance is the role of translation and using translators who identify and can translate both the technical and legal elements of transport security regulations. In countries where there

is only one official language and only one legal system, drafting regulations is still a difficult and highly specialized task. Preparing bilingual regulations, for instance into Arabic and English, is an even more challenging proposition, especially when experts not familiar with the mother language of the Member State are asked by the IAEA to support expert missions to review transport security regulations. This further emphasizes the importance of a regional approach where the country may use experts from neighboring countries to support such activity.

TECHNICAL CONSIDERATIONS

Before the IAEA team arrives and does its initial assessment and review, "Member State homework" would be required. A regulatory and governmental review would be conducted, a "regulatory inventory" to identify the structure of, and involvement other government agencies that will or may be impacted or be impacted by new regulations. The ideal team would be an interdisciplinary mix of technical and legal experts.

1. Interviews and Information gathering.

The team would be a mix of legal and technical experts. They would arrive in country and start to interview cognizant parties. This conversation will span all levels of the government, industry, non-government organizations and others as identified in the initial homework assignment. As the team conducts interviews a working group from the MS is established and begin the process to gather sort, analyze the information. The working group would have done its "homework" and have a good working knowledge of the MS political structure. Knowledge of the MS structure is a critical step in knowledge how the regulatory process can begin. What agencies will be involved, how other regulations for the movement of dangerous goods are regulated and secured.

2. Analysis, overlaps "gaps and seams".

The team will look at existing legislation that governs all manner of transport within the MS. A list or cross walk is recommended for tracking each of the MS regulatory authorities and what requirements will need to be established. This will be based on the MS materials to be used. The process will include a discussion on the need for addressing security issues of the emerging MS. The basic concepts of security will be address such as detect, delay, response. Additionally, the basics of communication, redundancy, security protocols and other elements of IAEA transportation security requirements will be addressed. This is the portion of the mission where the team will apply the concepts and recommendations found in IAEA security and safety publications.

3. Recommendations.

The team will gather all the background information, in country interviews regulatory guidance and begins to develop regulatory suggestions. It will be a synthesis of all the information gathered in the interview process.

4. Follow up and refinement.

The team will conduct follow up and refinement of the MS progress for the development and promulgation of new regulations.

THE PROPOSED PROCESS FOR REGULATORY DEVELOPMENT OF TRANSPORT SECURITY REGULATIONS

Before any nation can successfully enter the nuclear family, they must have a comprehensive regulatory regime in place that encompasses all areas of the member state regulatory apparatus. This is succinctly described by Laurence G Williams, OBE, when he stated:

> A country wishing to embark on a nuclear power programme will be expected to demonstrate to itself and the international community that it can successfully manage the technology. For a country with little or no experience of the use of nuclear energy the adoption of a nuclear power programme will present it with a number of challenges that must be overcome. Of particular importance are the challenges associated with the ability to effectively regulate nuclear safety and nuclear security; and to deliver an effective non-proliferation safeguards regime. [7]

In proposing a methodology to support Member States in developing transport security regulations, the IAEA consulted both technical and legal experts in the area of transport. Those conversations started with the following questions: "Where do we start?" "How do we enforce them [the regulations]?" "What else may exist in the Member State's legal framework that may relate to transport security of radioactive and nuclear material?" The process proposed herein is a systematic and comprehensive review of not just "transport regulations" but a holistic review process of the Member State's entire legal framework, spanning multiple ministries and existing regulatory regimes for the movement of all classes of hazardous material. The proposed new regulatory process developed by the IAEA must be country-specific and reflect the national constitutional and legal framework, the local threat environment, the cultural traditions, technical capacities, and human and financial resources of the Member State endeavoring to develop transport security regulations. Additionally, the regulations must be balanced with the concerns of commerce, sustainability, and enforceability.

The process development over the course of the last year through the IAEA is a multi-step process that encapsulates the questions and concerns presented by experts and those Member States embarking on regulatory development in the area of transport security.

The early stages of the process require the Member State to take a "legal inventory" of the existing laws and regulations involving transport of hazardous materials, including that of radioactive and nuclear material known by the internationally accepted shipping designation as Class 7. In so doing, the Competent Authority should designate a legal and technical expert in country to be the "shepherds" for moving the process forward. During this inventory, relevant stakeholders at both the government and private sector (shippers, carriers, and receivers) should be involved to explore issues in transport in that Member State. As the Member State is developing their legal inventory, the Agency, simultaneously is identifying a legal and technical expert team to support the Member State and provide assistance where needed.

Following the legal inventory, the Competent Authority should determine which type of materials the regulation should cover (radioactive, nuclear, or both). At this juncture, the legal and technical experts should be consulting appropriate IAEA guidance documents, particularly those of NSS-20, NSS-13, NSS-9 (Rev.1) and NSS-26-G. During the drafting phase, the Member States and the IAEA experts may use a series of documents developed as a toolbox to answer questions a Competent Authority may have over the course of the process and includes specific guidance for particular security measures (shipment verification, communications, in-transit storage, etc.).

Once the regulation has been drafted, the IAEA working with the Member State will hold a workshop on consolidation of the regulation to allow stakeholders the opportunity to discuss the regulation and allow the IAEA experts an opportunity to present their review of the regulation. Once the consolidation and stakeholder process has been completed, the regulation may require further revision, but following these revisions, the regulation should be ready for enactment or promulgation, depending on the institutional arrangements in that Member State. This process may be iterative and take time as to be adaptive to the national requirements in country.

While this process is relatively new and still under development, there are IAEA Member States currently undergoing the process of developing transport security regulations, one of those countries being Burkina Faso. The next section provides a brief background to the process for Burkina Faso and lessons learned during their transport security regulatory development journey.

BURKINA FASO AND THEIR PROCESS TO DEVELOP TRANSPORT SECURITY REGULATIONS

Burkina Faso has developed and adopted a decree on security measures for the transport of radioactive materials. This decree specifies the conditions under which materials emitting ionizing radiation can be transported securely. It was adopted pursuant to Article 18 of Law No. 032-2012 of 08 June 2012 on nuclear safety, security and safeguards. Burkina Faso is the first French-speaking country in West Africa to have developed such regulations.

The procedure for preparing the draft regulations

The draft decree is part of a set of several enforcement decrees of the law stated above. It was carried by the "Autorité Nationale de Radioprotection et de Surêté Nucléaire" (ARSN) which is the Nuclear Security competent authority in Burkina Faso. The development included two steps:

- The competent authority technicians (ARSN) carried out the legal inventory, the identification of the transport activities (volume, radionuclides, modes of transport, routes…) within and through the country, and then the drafting of an initial version of the regulations. The drafting team considered IAEA recommendations and technical guidance. Ongoing exchanges between the drafting team and the IAEA have taken place to better reflect the IAEA's requirements for security transport of radioactive materials.
- Subsequent working sessions were organized between the ARSN and the legal officers of the Institutional Development and Legal Affairs Directorate (DDIAJ) of the Ministry of

the Environment, Green Economy and Climate Change. These sessions were necessary to adapt the wording of the text to the national legal requirements. This phase took a relatively long time as legal officers needed to understand the technical terminologies, the terms devoted, before proposing the most appropriate legal formulations. For this reason, the methodology proposed by the IAEA in 2018 to involve a legal officer and a technician early in the process is important to reduce the time taken to develop legal texts.

The procedure for amending and validating the draft regulations

The draft jointly developed by the DDIAJ/ARSN was subsequently submitted for validation during a national workshop organized with the support of the Division of Nuclear Security of the IAEA. For four(4) days, the workshop brought together representatives from the national police, the national gendarmerie, the customs, the health Ministry, those of the Directorate General of the inland and maritime Transports, representatives of local and regional authorities, the shipper's Council, the civil society actors and the Bolloré Transport and Logistics Company representing the private sector, an expert from the IAEA, the ARSN officers, and DDIAJ legal officers. The workshop allowed participants to understand the draft text and make amendments based on the sensibilities of their activities. The financial support of the IAEA but also the participation of an external expert in the workshop were very important. This ensured consistency of the member country's vision with IAEA requirements. During the workshops the presence of an outside person allowed to regulate the debates and above all to explain some important concepts so that the participants could decide in full knowledge of the facts.

The procedure for adopting the draft decree

The document adopted at the end of the workshop was finalized by DDIAJ and ARSN and forwarded to the Council of Ministers for adoption by the Minister of the Environment, Green Economy and Climate Change. On May 08, 2019, the decree was adopted by the council of ministers. The decree will receive full application as soon as it is published in the official journal.

Comparison with IAEA perspectives on regulatory development

The experience of Burkina Faso is new in that no French-speaking country in Sub-Saharan Africa has yet developed a text of this nature. The drafting committee therefore had to draw on national practices in the preparation of legal texts while adapting them to radioactive materials. The process follows the IAEA methodology in several respects. As a reminder, the process of drawing up a decree in Burkina Faso has 6 main steps. Document review (1), draft development (2), discussion in a drafting committee (3); submission of draft to stakeholders for opinion or amendment (4), validation workshop (5), and finalization (6).

The main differences include the late involvement of lawyers in the process and the late involvement of other stakeholders in the process. The IAEA recommends that the project be notified to the various structures concerned in order to obtain their opinion before outlining the draft. In the case of Burkina Faso, the structures concerned received the draft drafted by the drafting committee and proceeded with its amendment. The process of developing the regulatory text on the security transport of radioactive materials in Burkina Faso was effective. Burkina Faso's experience was shared with the Democratic Republic of Congo and the Republic of Benin. Other countries could benefit from this experience as well as the support of Burkinabe experts who have real know-how in the process of drawing up regulatory texts on the transport security of radioactive materials.

SUMMARY AND NEXT STEPS

The methodology developed by the IAEA is a process with appropriate tools designed to support Member States in the development of transport security regulations for nuclear and other radioactive materials. The process and supporting documents developed are meant to empower and enable the Member State to draft a regulation that both aligns to their legal traditions and norms while aligning to international commitments and guidance.

From the perspective of the IAEA, the main objective to developing a regulatory process for transport security of nuclear and other radioactive material is to strengthen the network of regulatory drafters including technical and legal experts in different regions. While the IAEA and the Organization for Economic Cooperation and Development offer several regulatory drafting capacity-building opportunities, such as School on Drafting Nuclear Security Regulation and the International School of Nuclear Law, the complex nature of transport required further attention by the Agency.

Working with both technical and legal experts, the process developed is meant to be adaptive. While Burkina Faso and other Member States are using this process, it is open to revision and already has areas for update and improvement. Regulatory development is a skill that balances the need to regulate with the need to ensure the regulated understand their responsibilities. This process will grow and evolve to meet the goals of the Agency while meeting the needs and legal traditions of the Member States.

REFERENCES

[1] INTERNATIONAL ATOMIC ENERGY AGENCY, Handbook on nuclear law. No. 621.039: 34 STO. Vienna (2003).

[2] INTERNATIONAL ATOMIC ENERGY AGENCY, Developing Regulations and Associated Administrated Measures for Nuclear Security, IAEA Nuclear Security Series No. 29-G, Implementing Guide, IAEA, Vienna.

[3] FIALKOFF, M.R., Regulatory Design for Transport Security Regulations of Nuclear and Other Radioactive Material, presented at Purdue University Conference on Active Non-proliferation, March 22-23, 2019, Lafayette, IN.

[4] INTERNATIONAL ATOMIC ENERGY AGENCY, Security in the Transport of Radioactive Material, IAEA Nuclear Security Series No. 9 Rev. 1, Implementing Guide, IAEA, Vienna (in preparation).

[5] INTERNATIONAL ATOMIC ENERGY AGENCY, Regulations for the Safe Transport of Radioactive Material, Safety Requirements, 2018Edition, IAEA Safety Standards Series No. SSR-6, Rev. 1, IAEA, Vienna (2018).

[6] INTERNATIONAL ATOMIC ENERGY AGENCY, Security of Nuclear Material in Transport, IAEA Nuclear Security Series No. 26-G, Implementing Guide, IAEA, Vienna (2015).

[7] WILLIAMS, L.G., Nuclear safety and nuclear security regulatory challenges facing a country embarking on a nuclear power programme, *The Journal of World Energy Law & Business*, 12(1), pp. 69-88, 2019.