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Industry's Potential Role in Implementing the CPPNM Amendment and Improving Nuclear Security

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Abstract. The long awaited Amendment to the Convention on the Physical Protection of Nuclear Materials (CPPNM) entered into force on 8 May 2016. The tension between State sovereignty and the need for clear international guidance and standards has made the nuclear security journey a long one that still continues. The Amendment, in codifying a set of core nuclear security objectives and principles, strengthens nuclear security by extending the Convention beyond nuclear materials in transit and building additional (and much-needed) international norms for protection of nuclear material and facilities. However, the Amendment's provisions are broad, with few specifics. The vague treaty language qualifies the requirements in that physical protection measures are applied only "insofar as reasonable and practicable". While this provides States with flexibility in implementing their physical protection regimes, it leaves many issues open for later interpretation.

States are expected to interpret the Convention requirements and as necessary enact in their domestic context the primarily legislative and administrative requirements of the Amendment and its principles. Industry will be important to satisfying these requirements, especially because the Amendment states, "The prime responsibility for the implementation of physical protection of nuclear material or of nuclear facilities rests with the holders of the relevant licenses or of other authorizing documents (e.g., operators or shippers)". This means industry will be called on to enact the relevant principles, which have been further detailed in International Atomic Energy Agency (IAEA) guidance. Industry can either be passive and react to regulatory developments, or take the initiative to help establish cost-effective approaches to evidence compliance with the Convention and its amendments.

The nuclear industry has already shown its interest in international harmonization and has demonstrated strong leadership in many areas, including safety. It should now take the opportunity to do so more strongly in security. Only the World Institute for Nuclear Security (WINS) has developed specific guidance on nuclear security management practices that have been developed with active industry input. The announcement in September 2016 that industry was establishing a senior level Nuclear Industry Steering Group on Security (NISGS) was a clear indication that industry now intends to address important security issues. The IAEA and States should welcome this and partner with industry to address nuclear risks as an integrated whole encompassing security, safety, and other risk areas.

The occasion of the Amendment coming into force represents a significant opportunity in this post-Nuclear Security/Industry-Summit era for industry to create a forum for stakeholder collaboration and for helping to define what is reasonable and practicable for the operators and shippers who are responsible for implementing the requirements. Mechanisms for continuous review to update

interpretations are also needed because what appears to be reasonable and practicable today may change in five to ten years. Furthermore, requirements that are poorly developed and applied could have a detrimental impact on the nuclear sector and its contribution to global efforts to reduce greenhouse gases and mitigate climate change.

Key Words: Amendment to the Convention on the Physical Protection of Nuclear Materials (CPPNM), operator and licensee requirements, Nuclear Industry Steering Group on Security (NISGS), reasonable and practicable

I. Background on the CPPNM Amendment and How it Affects States and Industry

Nuclear insecurity carries the potential for trans-boundary consequences with global repercussions. The long held belief that State sovereignty over national security interests is more important than international concerns is giving way to a new internationalism; however, it has taken stakeholders a long time to agree that nuclear security can be addressed on an international level [1]. In 1972, the Director General of the IAEA convened a group to develop recommendations on physical nuclear material; these recommendations, which became INFCIRC/225, were non-binding and unenforceable by the IAEA [2]. Consequently, governance in nuclear security was largely voluntary.

States' efforts to strengthen this voluntary governance structure led to the development of the original Convention on the Physical Protection of Nuclear Material (CPPNM) [3/4]. These efforts were stalled by the continued reluctance of some States to acknowledge that the IAEA had any legal basis to address nuclear security. This tension between national concerns and international interests took place during the Cold War when the United States and the former Soviet Union were ratcheting up their nuclear stockpiles and the security of the nuclear industry was seen through a lens of national defense.

To forge a consensus, the CPPNM had a more limited scope than INFCIRC/225 and addressed physical protection of material in international transport, which was then considered to be the most urgent need. The Convention also included provisions requiring criminalization of certain offenses in transport and in domestic use and called for cooperation in reporting and recovering nuclear material [4]. This was significant because it made it more difficult for criminals to find refuge in a country that would not prosecute such offenses.

The CPPNM came into force in 1987—eight years after its adoption [5]. However, the Amendment to the CPPNM did not take effect until 2016—almost 30 years later [6/7]. One of the reasons for such a delay was that negotiations over the Amendment continued to be hampered by the concept of State sovereignty and States' reluctance to subject themselves to binding international standards on sovereign soil. The Amendment extended the footprint of the CPPNM principles to domestic use and storage of civilian nuclear materials; covered additional offenses, including the smuggling of nuclear material and sabotage (or threatened sabotage) of nuclear facilities; and enhanced collaboration between governments to recover trafficked material and respond to acts of sabotage. However, like the underlying CPPNM, the Amendment did not directly cover the more than 80% of nuclear material that exists worldwide for military applications. Nor did it cover civil use nuclear material stored at the

same locations as military-related material. As of November 2016, 153 States are party to the original convention [5]; as of September 2016, 104 have also adopted the Amendment [7].

Two Points of Special Concern

Two points in the amended convention deserve special attention: the definition of *reasonable and practicable* and the emphasis on *license holders* as the entities within the State who are responsible for implementing the physical protection measures. Article 2A of the Amendment states that when implementing a physical protection regime, each State Party shall "apply insofar as is reasonable and practicable" the specific fundamental principles of physical protection of nuclear material and nuclear facilities (Principles). The Principles are applied through a State's laws, regulations and regulatory process. The terms *reasonable and practicable* were included in the Amendment language to give States the flexibility to adapt the fundamental principles to their own nuclear programmes, which are at different levels of development [8][1]. Such ambiguous language is notorious in treaties. For example, in the Convention on Nuclear Safety, Article 6 states, "...the Contracting Party shall ensure that all reasonably practicable improvements are made as a matter of urgency to upgrade the safety of the nuclear installation. If such upgrading cannot be achieved, plans should be implemented to shut down the nuclear installation as soon as practically possible" [9]. Similarly, the Convention on Early Notification of a Nuclear Accident states, "A State Party …shall, as far as is reasonably practicable, respond promptly to a request for further information or consultations sought by an affected State Party with a view to minimizing the radiological consequences in that State" [10].

Although such wording allows for broad interpretation, the Vienna Convention on the Law of Treaties calls for a good faith interpretation of treaty terms "in their context and in the light of its object and purpose". It further calls for the application of norms in interpreting treaty requirements [11]. Thus, if the newly-expanded Convention leads some States to apply domestic practices that lend an interpretation to what is reasonable and practicable, those practices could be considered relevant for other States. Even for those who have signed and not ratified the CPPNM Amendment but who have ratified the Vienna Convention, such as Brazil, such practices may ultimately be considered customary law and binding to some extent.

The wording *reasonable and practicable* also implies that a risk assessment has been done. Case law in the United Kingdom has defined the term *reasonably practicable* more narrowly than the term *physically possible* and implies that a computation of risk must be made against the measures necessary for averting the risk whether in money, time or trouble [12]. The affordability of specific measures does not relate to the financial status of the individual duty

[1] As was noted to the US Congress, "The Amendment is intended for many States with vastly different nuclear infrastructures—from those with no nuclear materials to those that have advanced nuclear programs—so that flexibility in implementation of the Fundamental Principles was essential and was a bottom-line requirement for the United States and many other States as well in the negotiation of the Amendment." See reference [8].

holder but is a broader social judgment that looks at what might be generally affordable across sectors. The same social considerations apply to the nature of the threat and whether the threat is reasonably foreseeable—whatever the government's formal threat assessment might define.

The broad Convention terminology represents an opportunity for industry to take a proactive approach to conducting its own risk assessments and to help define what is reasonable and practicable for State regulators. Industry has hands-on experience in implementing requirements and can ensure that an industry-wide cost-benefit analysis is fully taken into account. In some States, such as the United States, regulators are required to take the voluntary consensus standards in industry into consideration when they are developing regulations and to also perform a cost-benefit analysis before enacting regulations. In practice, courts also apply the concept of reasonableness when considering what a reasonable person might do in general, as well as in business when considering what is customary in industry.

This leads to the second part of the Amendment—Fundamental Principles—and its implications for industry. The Amendment requires, "In implementing the obligations under paragraphs 1 and 2, each State Party shall, without prejudice to any other provisions of this Convention, apply insofar as is reasonable and practicable the following Fundamental Principles of Physical Protection of Nuclear Material and Nuclear Facilities....". Although the States are identified as being accountable for applying the principles, the actual responsibility for implementation often falls to the operators (e.g. *license holders*). The critical question here is how and when treaty requirements, in this case its principles, are implemented. In effective cases, domestic authorities receive feedback on how to implement certain nebulous requirements. The original CPPNM, Article 4 (3) called for a State to prevent non-signatories from transiting nuclear material across its territory unless it had received assurances "as far as practicable that this nuclear material will be protected during international nuclear transport at the levels described in Annex 1".

However, the Nuclear Regulatory Commission (NRC) noted that new regulations were needed to incorporate the CPPNM's requirement for advance notification and assurances regarding shipments of nuclear material among countries not party to the Convention. It subsequently proposed a rule on 14 July 1983 (48 FR 32182) that industry considered to be burdensome. One reason for this was that the proposed rule required multiple notifications to the NRC regarding transient shipments. After receiving such comments, the NRC developed a rule that required only one notification; it also reduced the notification time period from 14 to 10 days. (In this instance, industry was able to change the requirements, but this is not always the case.) Industry also reported that many inconsistencies in State-level requirements resulted from the lack of specific guidance in the Convention because operators had to adapt to the rules of different States. As a result, the flexibility reduced commonality in transit requirements [13]. When looking at the Amendment, the United States found that it would not require any NRC regulatory changes and that only limited legislation was needed, for

example to expand criminal penalties. This legislation was enacted in 2015 [14]; other States enacted similar legislation so the Amendment could enter into force.

However, given the fluid nature of the requirements within the context of reasonable and practicable—whose connotations are always changing—and the importance of influencing many stakeholders to enact the requirements, it is important to review the Principles of the newly-amended Convention to understand how they apply internationally to those in industry holding responsibility for nuclear materials. Other conventions and UN Security Council resolutions have also identified operators and industry to be affected through State mechanisms.[2] The identification of licensee requirements in the newly amended Convention is significant primarily because of the more detailed Fundamental Principles included in the Amendment and the relationship of these Principles to the latest version of INFCIRC/225 [15].

II. The Future Role for Industry

Traditionally, conventions and treaties lead competent authorities in a State to enact specific laws and/or regulations; license holders, such as operators and shippers, are simply expected to adhere to them. This top-down approach to defining regulations and the laws on which they are based is appropriate, but the reality is that such a process often ignores the role of license holders and their responsibility to implement security arrangements. The assumption is that simply because the "State is accountable for security" implementing laws and regulations somehow deals with the situation with a single wave of the political hand. The reality is, of course, very different. The Amendment now specifically recognizes the essential role of licensees by asserting, "The State should ensure that the prime responsibility for the implementation of physical protection of nuclear material or of nuclear facilities rests with the holders of the relevant licenses or of other authorizing documents (e.g. operators or shippers)".

[2] For example, the Convention on Nuclear Safety states, "Each Contracting Party shall ensure that prime responsibility for the safety of a nuclear installation rests with the holder of the relevant licence and shall take the appropriate steps to ensure that each such licence holder meets its responsibility" and that responsibility includes reporting safety incidents in a timely manner. The Safety Convention also calls on contracting parties to ensure that "programmes to collect and analyse operating experience are established, the results obtained and the conclusions drawn are acted upon and that existing mechanisms are used to share important experience with international bodies and with other operating organizations and regulatory bodies". See reference [9]. UN Security Council Resolution 1540, passed under Chapter VII of the Charter of the United Nations and therefore binding on States, calls on all States to prevent proliferation and "Develop and maintain appropriate effective physical protection measures" including over nuclear and related materials. In calling for States to adopt appropriate effective controls, 1540 also calls for States "To develop appropriate ways to work with and inform industry and the public regarding their obligations under such laws" [16]. International nuclear liability treaties also detail operator responsibilities, including their strict liability.

This explicit recognition of licensees' responsibility for security is important because it brings into sharper focus the role that industry must play in the future to help inform and formulate international policy in nuclear security, just as it has with nuclear reactor design, safety and transport. For example, the World Nuclear Association (WNA) established the Working Group on Cooperation in Reactor Design Evaluation and Licensing (CORDEL). This industry-sponsored initiative seeks to adopt consistent approaches to reactor design as well as aspects of operations to facilitate State licensing and oversight. Industry has an inherent interest in helping to reduce variations in how States regulate, interpret and enforce treaty norms. Variations can be extremely costly for industries—such as nuclear—that are highly regulated and that cross national boundaries when supplying, building and managing operations.

Industry has also proven its leadership in safety. For example, the World Association of Nuclear Operators (WANO) performs peer reviews of nuclear operators and has its own performance indicators. Because it has found that safety culture is an important element in all major nuclear plant incidents, WANO has committed to conducting safety culture reviews of all of its members by 2018 [17]. Similarly, the Institute of Nuclear Power Operations (INPO) provides safety guidelines and peer reviews to US nuclear power plants [18]. Furthermore, the pool of nuclear insurers has developed guidelines for evaluating operations against what it has determined to be best practices, including newly-detailed guidelines on nuclear safety culture [19].

Other independent bodies, such as the American Society of Mechanical Engineers, Bureau Veritas with Areva, and ISO have established quality standards and guidelines in nuclear-related areas [20]. However, none of these groups has delved into the security area, which is considered to be the purview of the State. The only exception is cyber security insofar as it affects safety, emergency planning and incident response. Only the World Institute for Nuclear Security (WINS) has developed specific guidance on nuclear security management practices from an operator's point of view and with active industry input. To date, WINS has published thirty-five Best Practice Guides; the guide on Security Culture is its most frequently downloaded document.

An important development in industry engagement commenced with the start of the Nuclear Security Summits, initiated by US President Barack Obama, when the nuclear industry held its own Summits coincident with these meetings. The Nuclear Industry Summits resulted in a range of Working Group Reports and Joint Statements on behalf of industry; most of these, however, consisted of statements of current accomplishments or aspirations rather than a forward work plan. A clear indication that industry now intends to proactively address this issue took place in the margins of the September 2016 IAEA General Conference when industry representatives announced they were establishing a senior level Nuclear Industry Steering Group on Security (NISGS).

The formation of the NISGS is an important and welcome milestone in industry's role in supporting the development of effective and efficient nuclear security practices and improved training and governance arrangements. The group's Terms of Reference are to establish an international committee, principally of senior nuclear industry executives, that has four key objectives:

1) To share relevant operating experience and endorse position papers for the nuclear industry (including other sectors that use nuclear or other radioactive materials) that identify effective and cost-efficient security management approaches.

2) To promote high quality professional development training materials for nuclear security, which are reviewed, endorsed and used by industry on the basis of each State's nuclear security requirements.

3) To ensure that nuclear security governance structures are effective and sustained.

4) To be the focal point between the nuclear industry and the global nuclear security architecture on all matters relating to nuclear security. In practice this means to:
    a. Support the IAEA nuclear security programme and ensure that industry views and requirements are communicated to the IAEA and incorporated into IAEA guidance wherever possible.
    b. Be the lead nuclear industry organisation for the Nuclear Security Action Plans with IAEA, UN, INTERPOL, the Global Initiative to Combat Nuclear Terrorism and the Global Partnership and the Global Partnership Against the Spread of Weapons and Materials of Mass Destruction and engage with their Working Group activities on a case-by-case basis.
    c. Be the lead nuclear industry organisation for other intergovernmental nuclear security initiatives such as the upcoming review conference of the Convention on Physical Protection and the Nuclear Security Summit Contact Group.

In many respects, the nuclear industry has much to learn from the civil aviation sector, where serious and fatal aviation-related security incidents have led to a much better organised Industry-National Regulator-UN Agency partnership. It is the International Civil Aviation Organization (ICAO), which is an analogue of the IAEA, that has overall responsibility for defining international aviation security standards. Largely because of the frequency of serious incidents, ICAO:

- has defined international minimum standards with which States must comply,
- operates an independent audit programme to verify State compliance,
- publishes its audit results to all Member States,
- has established a professional certification programme for aviation security management in conjunction with the aviation industry, and
- supports the certification of an international network of training institutes.

The principal interactions between ICAO and the aviation industry sector are via the Airports Council International (ACI) and the International Air Transport Association (IATA), which represent airports and airlines respectively and progressively interact with ICAO on policy development, training and implementation.

Comparable, effective industry and other stakeholder interactions with the IAEA have been largely absent to date, and the role of the nuclear industry has often been challenged as not being relevant. This is why the statement in the CPPNM Amendment that industry has responsibilities for nuclear security and the formation of NISGS are so important for the nuclear sector.

NISGS should take a broad view of risk. Industry needs to make efficient and effective risk management decisions, which include security as part of overall enterprise risk management. The IAEA and industry cannot afford to take a siloed approach to managing security, safety, safeguards and emergency management. The new IAEA publication *Leadership and Management for Safety, No. GSR Part 2* nominally calls for an integrated approach to managing "safety, health, environmental, security, quality, human-and-organizational-factor, societal and economic elements" [21]. However, the requirements are largely safety-driven, although they do recognise the need for safety and security cultures to share some ideas and approaches. Industry's input to IAEA guidance, along with its leadership in developing integrated risk management standards and approaches, plays an important role in ensuring the nuclear industry's safe, secure and economically viable growth.

The Convention's five-year review option will allow the principles and requirements to evolve. However, technologies and threats evolve faster than any convention can. Industry has the agility to take leadership on defining what may be reasonable and practicable in addressing security as well as other risk concerns. The NISGS is an important step forward in industry taking on this leadership role.

III. Conclusion

States that had not yet approved the amendment to the CPPNM were finally moved to do so in 2016 largely because of the political momentum created by the Nuclear Security Summits. The entry into force of the amended treaty is a welcome occurrence albeit not a sufficient one, given the Amendment's vague language. The treaty language needs to be made truly operational, building on the Amendment's fundamental principles. As licensees have specific responsibilities within the Amendment, they must now play a more active role in helping translate some of the broad treaty statements and in better defining what constitutes reasonable and practicable operational practice.

The announcement in September 2016 of the NISGS is a very positive step that will encourage industry to engage more effectively with the IAEA and other international organisations. The NISGS needs to create a forum for stakeholder collaboration and help define the nuclear

industry's positions with respect to security. It can and should improve certified professional training and enhance governance arrangements as they apply to industry, building on the work of WINS and taking into account IAEA recommendations. Industry and the IAEA should also learn from the aviation sector, where several major aviation-related terrorist incidents have led to political and industry involvement in security that is in many respects more advanced, integrated and professional than that found in the nuclear industry to date.

The Director General of the IAEA attended the Nuclear Industry Summit meeting in March 2016 and noted in his keynote speech: "The IAEA greatly values our cooperation with the nuclear industry" [22]. A key objective of the NISGS should be to build on that cooperation; in turn, the IAEA, from the Director-General down, needs to work with industry and demonstrate that it means what it says. And it needs to do this before a nuclear-related terrorist incident drives the international agenda.

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