CONTRIBUTION OF THE VIENNA CENTER FOR DISARMAMENT AND NON-PROLIFERATION TO NUCLEAR SECURITY: BUILDING EXPERTISE AND CONSENSUS THROUGH TRAINING AND OUTREACH

A. LAZAREV
Vienna Center for Disarmament and Non-Proliferation
Vienna, Austria
Email: alazarev@vcdnp.org

I. KIRSTEN
Vienna Center for Disarmament and Non-Proliferation
Vienna, Austria

Abstract

The IAEA has the central role in facilitating international cooperation on nuclear security. However, the universal acceptance by Member States of nuclear security as playing a fundamental role of the sustainable peaceful use of nuclear technologies remains elusive. There exist a number of reasons for this state of affairs, such as different levels of knowledge and understanding of nuclear security and its importance for the sustainable peaceful use of nuclear technologies. The paper discusses how the non-governmental organization Vienna Center for Disarmament and Non-Proliferation help overcome these obstacles by conducting outreach, providing a platform for frank and open discussions and implementing nuclear security courses, thus helping Member States strengthen the global nuclear security architecture and continue benefiting from the peaceful uses of nuclear technologies.

1. INTRODUCTION

The International Atomic Energy Agency (IAEA) is referred to as the global platform for nuclear security efforts, with a central role in facilitating international cooperation in the field. This role evolved after the 11 September 2001 terrorist attacks when the IAEA expanded its activities from providing support on physical protection of nuclear facilities and nuclear materials to include the broader issue of nuclear security. This evolution, however, has not been effortless, and universal acceptance by Member States of nuclear security as playing a fundamental role of the sustainable peaceful use of nuclear technologies remains elusive.

There are various reasons for this state of affairs. Key among these is the difference in IAEA Member States' perceptions of the role of nuclear security as it relates to peaceful uses of nuclear energy and nuclear applications. The Group of 77 and China, for example, are concerned that nuclear security considerations should not hamper the utilization of nuclear technology for peaceful purposes [1]. Whereas preventing the use of nuclear and radioactive material for the purpose of terrorist activities is a priority for many Member States, particularly developed ones, the priorities of developing countries relate to socio-economic growth and the role nuclear technology can play in supporting their development agendas.

Another complicating factor relates to financial constraints of Member States. Some developing States view nuclear security requirements as a burden hindering their access to nuclear technologies by increasing costs of its acquisition and use [2]. Lastly, there is a continuing issue of varying degrees of knowledge and understanding of nuclear security among Member States. This particularly concerns diplomats and policy makers.

As long as the understanding of nuclear security is not complete and as long as there are divergent views on something as fundamental as the relationship between nuclear security and peaceful uses, it will be difficult, if not impossible, to build consensus among the IAEA Member States. A concerted effort to change this dynamic is thus required. This paper examines the efforts being made by the Vienna Center for Disarmament and Non-Proliferation (VCDNP) to contribute to developing a common understanding among Member States of the role of nuclear security as related to peaceful uses of nuclear energy and other nuclear technologies as well as of the support provided by the Agency to Member States.

Part 1 of the paper considers a series of outreach events organised and conducted by the VCDNP. They include a high-level event promoting wider adherence to the Amendment to the Convention on the Physical Protection of Nuclear Material and six panel discussions convened with the aim of creating opportunities for dialogue between technical experts and diplomats on a range of issues related to the peaceful uses of nuclear energy

and nuclear technology and the role of nuclear security. Part 2 highlights the VCDNP Nuclear Security Professional Development Course, which took place in February 2019 in Vienna.

2. PART 1

The VCDNP has been contributing to strengthening nuclear security through outreach activities promoting adherence to international agreements and building consensus among IAEA Member States by facilitating a more substantive dialogue on nuclear security practices and their impact on the peaceful uses of nuclear energy and nuclear applications. In particular, the VCDNP's contribution was in three forms: preparing and hosting a high-level event to promote the Amendment to the Convention on the Physical Protection of Nuclear Material (A/CPPNM) with a view to securing its entry into force; conducting panel discussions; and producing related factsheets.

2.1 Promoting the Amendment to the Convention on the Physical Protection of Nuclear Material

In collaboration with the IAEA, the VCDNP conducted the high-level event promoting adherence to the A/CPPNM on 22 February 2016. The event featured the Director General and two high-ranking representatives of the IAEA, representatives of some States that had already joined the A/CPPNM as well as Ambassadors of fourteen countries that, while party to the CPPNM, had yet to become party to its Amendment. The event provided an excellent opportunity for national representatives to openly discuss with diplomats the importance of the Amended Convention, their countries' experiences and challenges their faced while implementing it. The diplomats also discovered what support they can be provided to tackle those challenges.

IAEA Director General Yukiya Amano gave an opening address, cautioning against complacency and arguing that the most dangerous country was the one that did not recognize the danger of nuclear terrorism. Mr. Khammar Mrabit, then Director of the IAEA's Division of Nuclear Security, and the IAEA's Section Head for Nuclear and Treaty Law, Mr. Wolfram Tonhauser provided briefings on the technical and legal aspects of the Amendment. Mr. Mrabit also described the IAEA's ability to provide technical assistance to Member States in meeting their obligations under the CPPNM and its Amendment, including support during States' ratification processes and assistance in its subsequent implementation.

Mr. Tonhauser then explained that the Amendment's primary purpose is to strengthen each of CPPNM three main components: scope of physical protection, criminalization, and international cooperation. He noted that the Amendment is a widely accepted and non-controversial instrument in the international arena, adding that it also was time to start thinking of the amended Convention as a "living document" and how to ensure its continued evolution over the coming years. Mr. Tonhauser noted that the IAEA offers legal assistance to countries in all areas of nuclear law, including nuclear security law.

Ambassador Vladimir Voronkov, Permanent Representative of the Russian Federation to the International Organizations in Vienna at that time, provided Russia's view on the Amendment emphasising, for example, that physical protection was the foundation upon which all other aspects (such as cyber security and forensics) rest. He noted that the threat of nuclear terrorism is greater today than ever before in view of terrorist groups' intent on causing mass casualties and an ever-growing amount of nuclear and radiological material worldwide. He also stressed the importance of maintaining the integrity of the CPPNM after the Amendment comes into force, thus avoiding two-speed implementation.

The second part of the event focused on country experiences, where representatives of a number of countries spoke about the challenges and rewards in achieving ratification of the CPPNM Amendment. For example, Ms. Laura Holgate from the US said that the ratification process in the US took ten years because of efforts to untangle the non-controversial Amendment from other contentious domestic issues not directly connected to it. By contrast, Mr. Thapelo Otukile of the Radiation Protection Inspectorate of Botswana explained how the process in his country took just nine months and spoke highly of the work of non-governmental organizations in contributing to the national debate on the matter in his country. Mr. Amrih Jinangkung of the Embassy of Indonesia in Austria spoke of the challenges faced by most countries in securing ratification of the A/CPPNM, such as its technical nature, which can make it difficult for policy-makers to appreciate the importance of it and the domestic treaty law requirements. Lastly, Mr. Raúl Martínez Villalba, Director of International Organizations at the Ministry of Foreign Affairs of Paraguay, described the process of gaining support for ratification in Paraguay. He also emphasised the helpful role of civil society in generating support for the Amendment among lawmakers and noted

that proper implementation of the A/CPPNM would require capacity-building, in which ongoing co-operation with the IAEA would be "crucial".

Virtually all participants to the event found it very insightful. They were particularly encouraged to hear about so many countries' imminent progress on the CPPNM Amendment, including their national experiences and ways to overcome challenges associated with implementation of the document. Furthermore, they commended the factsheet produced by the VCDNP, which had been disseminated before and during the event. The factsheet highlighted the core provisions of the Amendment as well as importance of its ratification, what legislative action it requires States to take and where States can obtain advice and assistance. It is also worth mentioning that the Amendment entered into force within less than three months following the event.

2.2 A platform for dialogue on the synergies between nuclear security and peaceful uses of nuclear technologies

The VCDNP is promoting a better dialogue among IAEA Member States in order to help build consensus on nuclear security in the IAEA. In order to be constructive, this dialogue has to be factually based and result in a better understanding of the challenges faced and efforts made by Member States and the IAEA to improve nuclear security when applying nuclear technologies for peaceful uses.

This platform for dialogue is built around a series of panel discussions comprising Member State experts responsible for the application and use of nuclear and other radioactive materials, as well as the IAEA or other international experts. The objective is to provide Vienna based diplomats and other nuclear professionals with an opportunity to engage substantively with experts on their efforts to use these materials in a safe and secure manner and to get a first-hand understanding of how the Agency is supporting them.

Whilst the Agency holds technical conferences focused on specific topics within nuclear security, these events are geared more towards technical experts, including nuclear regulators, rather than diplomats. Moreover, diplomats from smaller delegations, who often cover all the activities of the IAEA in addition to other portfolios, have to prioritise the meetings at the IAEA they can attend. We have found that diplomats in general rarely have the opportunity to engage substantively on nuclear security outside of policy and budget negotiations. We believe therefore that increasing the opportunities available for diplomats to engage on these issues will contribute to building consensus within the IAEA. Furthermore these panel discussions also promote the benefits of the peaceful applications of technology.

Since April 2018 six panel discussions have been organised by the VCDNP. The topics covered included the sustainable application of nuclear technologies for medical application as well as for agriculture and food security; nuclear power as a reliable affordable and sustainable energy for source for all; end of life management of sealed radioactive sources; and preventing nuclear smuggling whilst facilitating trade. These panel discussions are always held over lunch-time and a light lunch is provided to participants to make it easier for diplomats to fit the discussions into their busy schedules. On average we have 25 to 38 diplomats participating in the discussions from as many countries. Participants usually represent a wide range of countries from all the geographical regions. The panellists represent government, experts, regulators, operators and practitioners and the principle of regional and gender diversity is applied to the extent possible.

This initiative has been welcomed by the diplomatic community in Vienna. In the feedback received after each panel discussion, participants agree that the panels have improved their understanding of the benefits of the applications and what it takes for countries to apply these technologies in a safe and secure. They have also come away from these penal discussions with a much better understanding of the important role of the IAEA.

The full reports on these panel discussions can be downloaded from the VCDNP's website. The following is a summary of some of the highlights of these discussions:

Albania and Pakistan gave an overview of their efforts to provide cancer therapy in a safe, secure and sustainable manner. The Albanian regulator described how the high costs related to the end of life management of radioactive sources was a consideration in the decision to replace cobalt-60 teletherapy units with Linear Accelerators (Linacs). The IAEA has supported Albania in the purchasing, through cost sharing, of its Linacs and in training medical experts in the use of the Linacs. In Pakistan both cobalt-60 teletherapy units and Linacs are used for the treatment annually of 300 000 cancer sufferers. Whilst Linacs provide more precision treatment the Co-60 units require less maintenance and can be used in most environments including hospitals in remote locations. The IAEA's support to Pakistan includes security upgrades of its 18 nuclear hospitals. The panel agreed that a

strong regulatory framework was key to the sustainable use of nuclear technologies for cancer therapy and that countries have the right to choose the cancer treatment technology that best suits their purposes.

On the sustainable use of radioactive sources for agriculture and food security, participants learned about the Guatemala insect mass rearing and sterilization facility. This facility produces 1.2 billion sterile medflies a week and has released 0.19 trillion sterile males in the past three years thereby protecting the agriculture industries in Guatemala, Mexico, Belize and the USA and contributing to the development of multibillion dollar export industries in these countries. To irradiate this volume of flies, the facility uses three self-contained gamma irradiation units that weigh between four tons (the gammacell 220 unit) and eight tons (the 484-CP unit). These units are self-protecting as the sources cannot be removed without removing the unit. Further physical protection is provided through closed circuit televisions and intrusion detection systems, as well as through access control. Support from the IAEA includes the transfer of the Sterile Insect Technique (SIT) and other related technologies and capacity building and training support related to the application of the technologies and fruit fly management.

For the panel on "nuclear power as a reliable, affordable and sustainable energy source for all", the division of nuclear power at the IAEA provided an overview of the Milestone Approach. Country experts on the panel shared their experiences as embarking countries – the United Arab Emirates, Pakistan and Nigeria – in different phases of the milestone approach. All the panellists emphasised that to bring a nuclear power programme to fruition strong national leadership and commitment is essential, as is drawing on the experiences and expertise of other countries. Working closely with the IAEA as well as maintaining the highest standards of nuclear safety, security and safeguards were identified as key elements of sustainability.

Earlier this year a panel on the end of life management of sealed radioactive sources considered the options available to countries for end of life management of disused sealed radioactive sources (DSRS) and how countries cooperate with the international community to identify and apply the relevant options to meet their particular needs. Jordan shared its experience with reducing the storage space in its long-term storage facility to increase space for its DSRS. With the support of IAEA, Jordan has consolidated the majority of its 220 disused sources in one 20-litre container, which used to be stored in 35 containers of the same volume. Sri Lanka and its international partners developed a process of transporting its Category 1 and 2 orphan DSRS, which involves the use of pre-approved transport packages with one-time transportation certificates, allowing for their safe and secure transport to a country with the capacity to dispose of them. A representative of the Waste Technology Section of the IAEA explained that the IAEA's long-term goal is for all Member States to have a sustainable capability to manage DSRS safely and securely.

Recently in a panel on "facilitating trade while preventing nuclear smuggling" experts from Sri Lanka, Thailand and Nigeria shared their perspectives on keeping the balance between customs control and trade facilitation. Technology that detects nuclear material in cargo signals an alarm and the customs official must decide whether the cargo could contain nuclear material or whether the cargo contains material that has a level of radioactivity that would set off the alarm. In busy port like Colombo where there are 2000 alarms per month, reducing the time of alarm resolution is essential to ensuring that trade continues unhampered. An IAEA Coordinated Research Projects providing training an technology that is tailored to the needs of these Member States, Sri Lanka has been able to reduce and Thailand have been able to reduce the time of alarm resolution from 59 minutes to 39 minutes. The panel agreed that capacity development, regional and international cooperation and the development of technology that is user friendly and responds to the requirements of the user are essential to maintaining the balance between nuclear security and trade facilitation.

2.3 Factsheets

The VCDNP is also producing fact sheets related to the panel discussions, which serve as an additional source of information for diplomats and policy makers. To date, three fact sheets on the following topics have been released: Sustainable Use of Radioactive Sources for Agriculture and Food Security (November 2018) [3], Nuclear Power as a Reliable, Affordable and Sustainable Source of Energy (June 2019) [4] and Sustainable Use of Nuclear Technology for Medical Application (September 2019) [5].

The factsheets highlight the benefits of the application of nuclear technologies, a summary of the support provided by the IAEA, as well as the experiences of the countries as presented during the panel. Information about the radioactive sources or nuclear material used for applications is provided, as well as an explanation of the IAEA categorisation and the risk profile of the radioactive sources. The objective of these fact sheets is to combine, on one double sided, easy to assimilate A4 sheet, information on the material and technologies used, the benefits of

their applications, country experiences, and the support provided by the Agency. The fact sheets have been welcomed by the diplomatic community and are regularly downloaded from our website. Hard copies are on display during VCDNP events.

3. PART 2

The VCDNP developed a nuclear security course to support capacity development in IAEA Member States, which complements the IAEA activities enshrined in its Nuclear Security Plan 2018-2021 [6]. The first VCDNP Nuclear Security Professional Development Course took place on 4-8 February 2019 and was made available thanks to the support of the Carnegie Corporation of New York. The course was targeted at the nuclear energy policy makers, regulatory staff and diplomats of newcomers States to nuclear energy. There is a need for capacity building in the area of nuclear security geared at strengthening expertise among newcomer States, with a view to expanding the pool of qualified candidates from such countries for positions within their national authorities.

The course programme was developed in close coordination with the IAEA and James Martin Center for Nonproliferation Studies (CNS), Middlebury Institute of International Studies at Monterey, USA, and helped to enhance participants' understanding of not only technical but also key political nuclear security-related issues. They included the history of the nuclear security regime; binding and non-binding international instruments; the role of the IAEA and other organisations; opportunities and challenges related to nuclear security; and the policies and politics of nuclear security.

Throughout five days of the course, the participants actively took part in practical exercises and heard lectures delivered by IAEA staff members and other international experts. Specific lectures included: explaining the synergies between nuclear security, safety and safeguards; analysing potential scenarios of nuclear and radiological terrorism; describing a case study of a country implementing national and international nuclear security norms and recommendations; and discussing the threat and benefits of new technologies. In order to provide the participants with more practical insights into the work and activities of the IAEA, course sessions related to emergency management, materials out of regulatory control, nuclear forensics and response to incidents involving radioactive material took place at the IAEA Incident and Emergency Centre.

Out of the 21 course participants, the majority worked either at a ministry of foreign affairs or a national nuclear regulatory authority while the rest represented a nuclear power plant operator, a ministry of science and technology or an institute of nuclear technology. At the end of the course, participants completed an anonymous evaluation where most of them highlighted their satisfaction with the course structure and stressed their appreciation for the level of expertise of the speakers. They confirmed that the course contributed significantly to their knowledge and to their professional development in the field of nuclear security, the overwhelming majority of them rating this contribution as "excellent" or "very good". The participants also rated the usefulness of the course for their professional development, with ten of them stating that the course was "extremely useful", nine – "very useful", and one – "somewhat useful". In particular, participants mentioned that the course sessions had provided a great introduction to nuclear security and to all the related basic concepts. Many participants noted the relevance of the topics treated during the course for their work with the IAEA. More than four fifths of the participants considered that ''the scope was adequate for the duration of the course'' and offered a complete overview of the topic.

Many participants praised the wide range of topics covered, including the historical, legal, political and technical aspects of nuclear security. They also found very useful the emphasis put on differentiating major concepts such as nuclear security, nuclear safety and safeguards. Some participants complimented the expertise and knowledge of the lecturers as well as their variety and also appreciated the mix of participants.

The course will be expanded in future to include diplomats and practitioners from other Member States in order to meet the demand in nuclear security training and to support the VCDNP's goals of promoting a better dialogue between Member States on nuclear security thus contributing to achieving consensus on nuclear security in the IAEA.

4. CONCLUSION

Member States of the IAEA enjoy the benefits of the peaceful application of nuclear technologies for agriculture, health, industry, environmental protection and power production. It is however incumbent on each State to ensure that the technologies are applied safely and the materials are secured from loss, theft and from

malicious use. National security relies not only on robust regulatory and legal frameworks but also on regional and international cooperation and support. Whilst the IAEA has the central role in facilitating international cooperation on nuclear security, non-governmental organisations like the VCDNP can play an important role in supporting the IAEA and Member States in this regard. Staffed with world class experts, many of which have worked in national authorities and the IAEA, and partnering with global institutions, the VCDNP conducts nuclear security outreach programmes and training courses and provides a platform for frank and open discussions. Through the sharing of information and experiences, the building of networks between countries and between policy makers, technical experts and industry we have the best possibility, as the international community, to strengthen the global nuclear security architecture and to continue benefiting from the peaceful uses of nuclear technologies.

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