



Hot Spots weak links

Strengthening Nuclear Security in a Changing World

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Protection against nuclear terrorism is one of the critical issues facing the international community today. New and challenging security dimensions must be met.

During the Cold War, the main international security concern was the fear of a nuclear war and the spread of nuclear weapons. The post-Cold War era presented new security challenges, which recognized the need to strengthen the international regime of physical protection of nuclear materials.

In the post-9/11 period, threat perceptions include the potential terrorist use of an improvised nuclear explosive device, the use of a radiological dispersal device (RDD) and attacks against nuclear facilities, i.e. sabotage. These threats point to the need for an overall strengthening of the global nuclear security regime with attention to “weak links” that may offer soft targets for terrorists or criminals.

This article discusses some of the basic concepts and developments in the field of nuclear security; the legacy of the Cold War and the rise of new challenges to the global nuclear security agenda in the post-Cold War and post-9/11 periods; and efforts of the IAEA to strengthen the global nuclear security regime. The IAEA is filling an important and expanding role, yet more measures are needed.

The Evolving Context of Nuclear Security

The Cold-War Period

During the height of the Cold War, “nuclear deterrence” and “nuclear proliferation” dominated the global nuclear security agenda. In their national security strategies, States considered calculable threats of high-intensity and low-probability — nuclear conflicts based upon the predictable rational behavior of known State-level adversaries (also known as “rational actor theory”). A bi-polar security structure gave rise to the “nuclear deterrence” doctrine.

Concerns that additional States would acquire nuclear-weapon capability (“horizontal” proliferation) led to the conclusion of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) in 1968. While the Treaty prohibited non-nuclear weapon States parties to acquire nuclear weapons, “vertical” proliferation involving the development and deployment of more sophisticated nuclear weapons continued among the five nuclear-weapon States.

The NPT, which has now been in force for more than three decades, is one of the most successful international treaties. In the 1960s, it was feared that the number of nuclear-weapon States could rise to 20 and above, but due in large part to the

NPT, that number has been curtailed to about eight States. While the nuclear disarmament forecast under Article VI of the Treaty has not yet been achieved as expected, bilateral disarmament treaties and the voluntary reductions of nuclear weapons have lessened the global stockpiles of nuclear weapons from their Cold War heights.

The Post-Cold War Period

The end of the Cold War was marked by a shift from a bipolar structure of global security to more complex international relations. An increased risk for low-intensity national and regional conflicts emerged with new and more dispersed threats involving a larger number of actors: criminals or terrorists, which operate with trans-border networks.

The discovery in the early 1990s of clandestine nuclear programmes in Iraq and the Democratic People's Republic of Korea (DPRK) prompted the development and adoption of the Model Additional Protocol to safeguards agreements. In addition, the disintegration of the Soviet Union resulted in a larger number of States being left with nuclear weapons on their territories, and having responsibility for nuclear material. Also, dismantling of nuclear weapons resulted in large quantities of weapons-grade nuclear material in storage facilities.

The many cases of illicit trafficking in nuclear materials triggered an awareness of the need to strengthen the international physical protection regime. In 1999, the IAEA Director General, *inter alia*, convened an open-ended group of experts to examine the need to strengthen the Convention on the Physical Protection of Nuclear Material (CPPNM). The work was completed in 2003, when a report containing a number of proposals to strengthen the Convention was submitted to the IAEA Director General.

The Post 9/11 Period

The events of 9/11 in the USA demonstrated a new scale, dedication and organization of terrorist groups, which prompted the international community to re-evaluate the threat posed by terrorism, including potential threats to civilian nuclear programmes. The willingness of terrorists to sacrifice their own lives in the attempts to cause widespread death and destruction has prompted new nuclear security awareness.

While the threat that terrorists will acquire a nuclear weapon or related materials remains the most grave, the threat of a radioactive dispersal device (RDD) or sabotage of a nuclear facility or transport must also be seriously considered. The potential consequences of sabotage with a release of radioactive substances that could affect neighbouring countries point to a transnational dimension of nuclear security, contrary to the perception during the Cold-War period.

Thus, nuclear security in the post-9/11 period must consider the potential of: a) the theft of a complete nuclear weapon; b) the theft of nuclear material for the purpose of constructing a crude nuclear explosive device with or without the active involvement of a State; c) the theft of nuclear and other radioactive materials to construct an RDD; and d) attacks or sabotage directed against a power reactor, a fuel cycle facility, a research reactor or a nuclear transport.

The prevention of such events requires strong actions at the international, regional, and national levels. An internationally accepted and consistently and comprehensively implemented nuclear security regime in broad partnerships should make malicious acts very difficult to pursue.

What is the IAEA Doing?

The IAEA has adopted an integrated multi-track approach to assisting States in strengthening their nuclear security systems through a comprehensive Plan of Activities for Protection Against Nuclear Terrorism. The Plan covers measures to prevent, detect, and respond to malicious acts involving nuclear and other radioactive materials. It embraces advisory, evaluation, and training services, as well as legislative and technical support.

IAEA Nuclear Security Plan

The IAEA's mandate, technical competencies, extensive experience, and global reach make it a well-suited international organization to effectively assist States in improving their nuclear security systems. To confront the post-9/11 nuclear security threats and to provide nuclear security assistance to States, the IAEA Board of Governors, in March 2002, approved a Plan of Activities for Protection Against Nuclear Terrorism and assigned the highest priority to its coherent and effective implementation. The Plan covers three lines of defense: prevention, detection and response, supplemented with activities in support of information management and co-ordination.

The implementation of the Plan was estimated to require a minimum of \$36 million to be funded largely through voluntary contributions made to an extrabudgetary Nuclear Security Fund (NSF). As of January 2004, over \$27 million had been pledged by 24 Member States and one organization, of which almost \$18 million has been received. In addition, Member States provide substantial in-kind assistance including equipment, and the use of facilities, services, and cost-free experts for the implementation of the Plan.

The main features of the Plan include:

① **Evaluation of need.** At the core of the Plan is the assessment of States' needs for improved nuclear security. Since 2001, the IAEA has carried out over 60 advisory and evaluation missions to help States identify and remedy their

nuclear security needs. The purpose of missions under the newly established International Nuclear Security Advisory Service is to address States' needs across the entire spectrum of nuclear security related activities. The recommendations generated as a result of these missions provide the basis for subsequent targeted, nuclear security assistance, through IAEA programmes or through bilateral support. As a consequence, a joint, long-term workplan for improving security in the host State may be created for implementation in partnerships between the host country, the IAEA and bilateral programmes.

② **Education and training.** Strengthening nuclear security requires well-prepared staff. The IAEA assigns high priority to training, which it offers in an international, regional, and national context, depending on the subject areas. Several topics are suitable only in a national setting, such as workshops on design basis threat methodology, due to the sensitivity of security-related information and topics. Since 2001, the IAEA has conducted over 80 training courses, seminars, and workshops, which have had a positive impact on development of national cadres of nuclear security specialists in States.

③ **Supporting legal instruments.** The Agency works hard to bring about universal adherence to, and implementation of existing international legal instruments relevant to the enhancement of protection against nuclear terrorism, e.g. the Convention on the Physical Protection of Nuclear Material (CPPNM), the Code of Conduct for the Safety and Security of Radioactive Sources, and safeguards agreements and additional protocols.

To support the implementation of these instruments, the Agency develops and provides guidelines and recommendations. In addition, supporting technical documents have been developed on a range of security related topics. They

include design basis threat methodology, vital area identification, categorization of radioactive sources, security of sources, functional specification for detection instruments, the protection against sabotage against nuclear facilities, the due consideration of an "insider" threat, information technology security at nuclear installations, and preparedness and response to malicious acts involving nuclear and other radioactive material. The IAEA Nuclear Security Series of documents will provide a vehicle to reach a broader audience for publications in nuclear security.

④ **Co-ordination and cooperation.** International cooperation is essential for identifying best practices to combat nuclear terrorism and proliferation, knowledge sharing, resource allocation, information exchange and early warning. By working in co-ordination with States and groups of States, such as the European Union, which also provide bilateral security support, the Agency facilitates the provision of physical protection equipment upgrades, as well as of equipment for accounting, and detection of nuclear smuggling. To further support the combating of illicit nuclear trafficking, the IAEA provides nuclear forensics support to Member States for the characterization of confiscated material through dedicated laboratories around the world, and for the upgrading of tools for the detection of radioactive materials in trafficking.

International IAEA conferences such as the International Conference on the Security of Radioactive Sources held in Vienna, Austria (the Hofburg Conference) in 2003, and on National Infrastructures for Radiation Protection held in Rabat, Morocco, are effective means of addressing urgent topics in an international setting. In 2005, an international conference on nuclear security as a whole will be convened as well as an international conference on the safety and security of radioactive sources as a follow-up on the Hofburg conference in 2003.



At an IAEA training course in Cyprus, participants learn about ways to combat illicit trafficking in radioactive materials.

To enhance co-ordination at an international level, the IAEA participates in the meeting of the UN Security Council Counter-Terrorism Committee, and works closely with a number of international organizations, including Interpol, Europol, and World Customs Organization, in a wide range of areas for nuclear security.

Building a Robust Regime

The global nuclear security regime, which is at an early stage of its development, should be strengthened. This process should include both tackling the "hot spots" and eliminating "weak links."

Emphasis is on achieving an effective comprehensive global nuclear security framework that will serve as a reference point for States' efforts and for the Agency's support. Due consideration must be

A Comprehensive Approach to Security

The IAEA has adopted a broad conceptual approach to nuclear security by pursuing “the means and ways of preventing, detecting, and responding to sabotage, theft and unauthorised access to or illegal transfer of nuclear material and other radioactive substances, as well as their associated facilities.”¹

While in the past, matters related to nuclear safety, safeguards and, in particular, nuclear security, were each dealt with separately, recent developments have unfolded their overlaps and potential synergies. The 2003 IAEA General Conference² acknowledged such linkages and noted, *inter alia*, that strengthening the safety of radioactive sources contributes to enhanced security of such sources. It further noted that safeguards agreements, additional protocols, as well as States’ systems of accounting for and control of nuclear materials, contribute to preventing illicit trafficking, deterring and detecting diversion of nuclear materials.

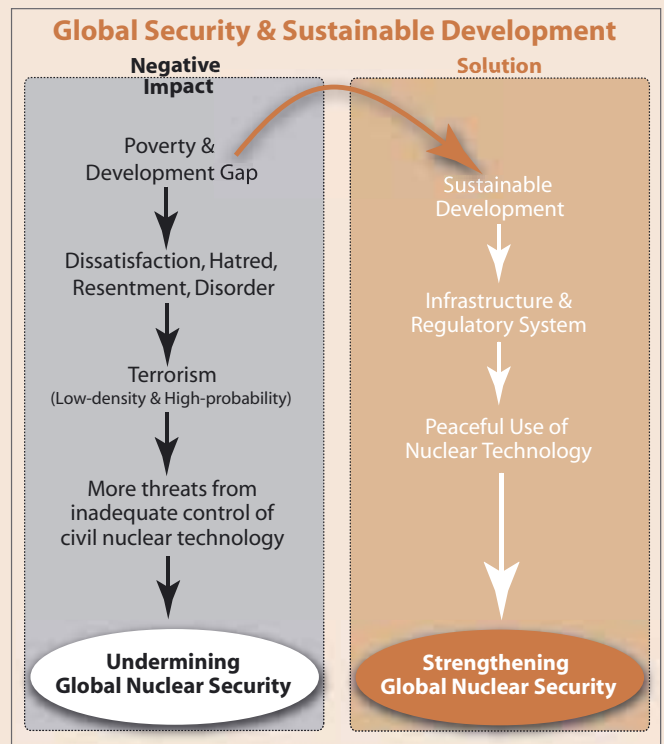
Both developed and developing countries depend on the continued availability of nuclear energy and on the day-to-day access to radioactive materials used in medicine, agriculture and industry. Continued peaceful uses of nuclear and radioactive substances are essential for sustainable development.

It has long been widely recognized that the development and use of nuclear technology require due consideration to human health and safety. There is now a growing awareness that these activities also require adequate security to protect them from malicious acts. Nuclear security and sustainable development, therefore, respectively serve each other’s needs and are important mutual prerequisites. An increased focus on and support for the

given to international and regional cooperation in efforts to protect against nuclear terrorism. It is essential that issues of nuclear non-proliferation, nuclear safety and nuclear security be dealt with on a comprehensive and integrated basis in order to achieve maximum success for the peaceful, safe, and secure use of nuclear technology.

Major Challenges

There is an urgent need to evaluate and strengthen the global nuclear security regime. Embedded in such an effort is the worldwide need to secure nuclear and other radioactive materials in non-weapon, non-nuclear use. The many storages of research reactor fuel containing highly enriched uranium, which can be used in an improvised nuclear explosive device must be seen in the perspective of the potential consequences should these materials come into the wrong



process of sustainable development and equitable socio-economic relations could have positive impact on efforts to address the root causes of terrorism and thus alleviate threats against peaceful nuclear activities.

¹IAEA working definition of nuclear security adopted by the IAEA Advisory Group on Nuclear Security.

²IAEA General Conference Resolution, “Nuclear and Radiological Security: Progress on Measures to Protect against Nuclear and Radiological Terrorism,” GC(47)/RES/8, September 2003.

hands. Furthermore, many research establishments with research reactors, laboratories and waste handling facilities require that much more attention be given to security.

The security of transport of nuclear and radioactive materials presents additional issues of concern to the international community. These questions are further complicated by the materials that present both a radiological and a chemical hazard. The privatisation of the nuclear power industry, the construction of new generations of nuclear power reactors, as well as of other nuclear fuel cycle facilities, compel expanded security-related responsibilities for the private sector.

It is also clear that robust, tight and internationally accepted nuclear security, which subscribes to a graded-recommendations approach based on risk and potential consequences,

is imperative to sustainable development, of which the day-to-day benefit of nuclear energy and nuclear applications is an integral part.

The Holistic Approach

Global nuclear security requires a multi-track and holistic approach. It includes efforts to prevent the spread of weapons of mass destruction and related material; the protection of sensitive equipment and technologies; control of radioactive sources from cradle to grave, the detection of malicious acts involving nuclear and other radioactive materials, and emergency and incident preparedness to respond to and mitigate the consequences of any such acts.

Building a Global Nuclear Security Regime

The top tier of a global nuclear security regime consists of the CPPNM and the Code of Conduct for the Safety and Security of Radioactive Sources. Safeguards agreements and additional protocols are recognized for their contribution to nuclear security. Likewise, the Convention on Nuclear Safety, the Convention on the Early Notification of a Nuclear Accident, the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency, and the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management are recognized as important components of the institutional framework.

It is noted that the CPPNM is one of the twelve conventions that have been identified to contribute to the prevention of terrorism, and therefore, a strengthened CPPNM will significantly reinforce the global nuclear security regime. The proposals made by the open-ended group of legal and technical experts to amend the CPPNM contain broadening of its scope to include: protection of nuclear material in use, storage and transport, and the protection of nuclear facilities against sabotage. Further, universal implementation of the Code of Conduct on the Safety and Security of Radioactive Sources will also strengthen the nuclear security regime.

The global security regime is only as good as its weakest link. Eliminating the “weak links” requires the utmost attention. It is essential to work toward the creation of a critical mass of intellectual and institutional resources in States, which will be able to provide the competencies required to establish and sustain robust nuclear security systems and facilitate their implementation. Cooperation among relevant national authorities is key to forming effective national networks. Enhanced interaction between governments and non-governmental institutions will facilitate the exchange of new ideas and increase public awareness of threats to nuclear security of the nations. Effective inter-governmental networks will support a constructive nuclear security dialogue.

The Agency will work towards establishing longer-term relationships with countries to provide assistance and support in their efforts to improve their nuclear security systems to reach the anticipated holistic goal of strengthened nuclear security. Through longer-term goals and work plans, the coordination of resources available to the Agency, as well as in bilateral and multilateral support programmes, will be facilitated. The nuclear security relevant recommendations and guidelines developed by the IAEA will provide the necessary reference points for the States when establishing their own goals for nuclear security in their countries.

Building an effective global nuclear security regime requires a concerted action by all States. Therefore, the IAEA invites all States to join in efforts to strengthen nuclear security at international, regional, and national levels by making the best use of the Agency’s nuclear security related services and by contributing financial and in-kind resources. It’s essential that issues of nuclear proliferation and the secure and safe use of nuclear technology be dealt with in a comprehensive and synergistic manner in order to achieve maximum success.

Is Enough Being Done?

The international community has taken important steps to make it much more difficult for any terrorist and/or criminal to use nuclear and radioactive materials to cause death, destruction and panic.

Yet, is enough being done? The consequences of an explosion of *one* crude nuclear device would be catastrophic, and the consequences of the sabotage of a nuclear facility may forever halt the development of nuclear technology for peaceful purposes and thereby hamper socio-economic development. Although an RDD may not cause mass destruction, the disruption and panic caused by the explosion of such a device and the unavoidable, likely vast contamination of and effect on the environment are likely to have unforeseeable consequences.

The Chernobyl catastrophe 18 years ago awakened the world to the fact that the global nuclear safety regime must be strengthened. The international community has now a window of opportunity to take proactive measures to prevent any catastrophic nuclear malicious event that may halt the future use of nuclear technology for the benefit of mankind. There is no room for complacency.

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