

Nuclear Security and the IAEA

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NUCLEAR SECURITY AND THE IAEA

Introduction

Owing to unprecedented concerns, generated by the uncontrollable proliferation of nuclear weapons of mass destruction, the possible use of nuclear material for non-peaceful purposes by non-State actors, and the incapacity of numerous concerned States to withhold these threats, the international community has been striving to underline the need for the physical protection of nuclear material and nuclear facilities from theft and sabotage. To this end, the international community has been working strenuously on establishing instruments, and adopting the necessary practices to the physical protection of nuclear material. The International Atomic Energy Agency's (IAEA) nuclear security activities have devoted great effort to improve worldwide security of nuclear and other radioactive material in use, storage and transport, and of associated facilities, by supporting Member States in establishing, maintaining, and sustaining effective national nuclear security regimes, through the implementation of relevant international legal instruments, to reduce the risk of a successful act of nuclear terrorism.

This paper aims at providing an overview on nuclear security consciousness and some of the efforts performed by the International Community to achieve and improve the nuclear security culture worldwide. Moreover, this paper takes a glance at some of the numerous activities conducted by the IAEA to contribute to the physical protection of nuclear material. To properly address and understand the role and ambitious objectives of the IAEA on promoting and expanding its scope on Nuclear Security, this paper provides some background information on the history of the IAEA and some of its international legal instruments.

The International Atomic Energy Agency

The History of the IAEA

On 15 November 1945, following the August bombing of Hiroshima and Nagasaki, and the failed attempt to conclude a covenant between USA and USSR “to control and limit the use of the atomic bomb as an instrument of war and...to direct and encourage the development of atomic power for peaceful and humanitarian purposes...” to avoid a post-war nuclear arms race, President Truman and Prime Ministers Attlee of the United Kingdom and Mackenzie King of Canada, met in Washington to issue a “Three Nation Agreed Declaration on Atomic Energy” in which they agreed “to proceed with the exchange of fundamental scientific literature for peaceful ends with any nation that will fully reciprocate” but only when “it is possible to devise effective reciprocal and enforceable safeguards acceptable to all nations” against its use for destructive purposes. They suggested that the new-born United Nations should promptly undertake the nuclear issue. Soon after, on 27 December 1945, at a meeting in Moscow of the Council of Foreign Ministers, the USA and the United Kingdom proposed and the USSR agreed that a United Nations Atomic Energy Commission (UNAEC) should be created “to consider problems arising from the discovery of atomic energy and related matters.” The UNAEC was launched on its brief and barren career. At the end of 1949, the UNAEC concluded its work, as the USA and the USSR and their allies revealed that their aim was not to prevent the spread of nuclear weapons but to do away with them altogether. Hence an international authority should be created to own or “control and operate” all nuclear activities that lead to the production of fissile material, including all reactors except those that are “non-dangerous”. The authority would license and inspect all other nuclear activities and foster beneficial nuclear uses and research. When the authority was operating effectively the USA would stop making nuclear weapons, destroy those it had and give the authority full information about the production of nuclear energy.¹

In September 1953, amid growing fear of the Soviet nuclear arsenal and of a nuclear war, the President of the United States of America, Dwight D. Eisenhower, came upon the idea of drawing the fissile materials of the nuclear weapon States into a common pool to be used by all nations for peaceful purposes. This idea was seen as a new and evolutionary approach to nuclear arms control, as a means of building East–West confidence, and as the road to an international agency that would promote the civilian applications of nuclear energy.¹

On 8 December 1953, President Eisenhower proposed at the General Assembly of the United Nations the creation of an organization to promote the peaceful use of nuclear energy and to seek to ensure that nuclear energy would not serve any military purpose.² A year later, on 4 December 1954¹ Eisenhower’s proposals led to the creation of the International Atomic Energy Agency (IAEA).²

In view of the Soviet rejection of the US proposal, the US concept of the agency began to change and it informed the Assembly that “...it might be preferable that the agency act as a clearinghouse for requests rather than take custody of fissile material.” The concept of a ‘clearing house’ for nuclear transactions thus emerged as an alternative to that of an international pool or bank of nuclear material. However, when the USSR agreed to join

the negotiations and had pledged some fissile material, the USA swung back at least partly to the concept of the IAEA as a pool or bank.³

For nearly forty years after its birth in 1957 the IAEA remained essentially irrelevant to the nuclear arms race.² However, in the aftermath of the 1962 Cuban missile crisis, the USA and the USSR began seeking common ground in nuclear arms control.⁵ The end of the Cold War revived the idea of placing military stocks of fissile materials, including material from dismantled nuclear weapons, under the IAEA's surveillance, thus creating confidence that it will not revert to military use.²

The IAEA's authorized functions, set by the eight-nation group: the USA, United Kingdom, France, Canada, Australia, South Africa, Belgium and Portugal, in 1956, included:³

- Take any action needed to promote research on, development of, and practical applications of nuclear energy for peaceful purposes (Article III.A.1);³
- Provide materials, services, equipment and facilities for such research and development, and for practical applications of atomic energy “with due consideration for the needs of the under-developed areas of the world” (Article III.A.2);³
- Foster the exchange of scientific and technical information (Article III.A.3);³
- Establish and apply safeguards to ensure that any nuclear assistance or supplies with which the IAEA was associated should not be used to further any military purposes — and apply such safeguards, if so requested, to any bilateral or multilateral arrangement (Article III.A.5);³
- Establish or adopt nuclear safety standards (Article III.A.6).³

The Statute did not explicitly mention what was to become one of the main functions of the IAEA, namely the provision of ‘technical cooperation’. However, the Statute underlined the special importance of helping developing countries to make use of nuclear energy. This was implicit in Article II, which enjoined the IAEA to seek “to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world” and explicit in Article III.A.2, which requires the Agency to give “due consideration for the needs of the under-developed areas of the world.” It was also explicit in the clause added to Article III at the Conference on the Statute, which authorized the IAEA “to encourage the exchange and training of scientists and experts in the field of the peaceful uses of atomic energy” (Article III.A.4).³

The IAEA's Safeguards

US President Eisenhower's ‘Atoms for Peace’ has constituted the International Atomic Energy Agency core policy since its genesis in 1957. However, the Agency has always had the dual, even contradictory, role of promoting the peaceful use of ‘atomic energy’ whilst simultaneously trying to ensure, via safeguards, that this use was not put to military purpose. Articles IV and III, respectively, of the Non-Proliferation Treaty (NPT) reinforced this dual role whereby Non Nuclear Weapon States (NNWS) were obliged to accept comprehensive safeguards agreements (CSAs) with the IAEA.⁴

As more countries mastered nuclear technology, concern deepened that these would acquire nuclear weapons, particularly since two additional nations had "joined the club", France in 1960 and China in 1964. The safeguards prescribed in the IAEA's Statute, designed chiefly to cover individual nuclear plants or supplies of fuel, were clearly inadequate to deter proliferation. There was growing support for international, legally binding, commitments and comprehensive safeguards to stop the further spread of nuclear weapons and to work towards their eventual elimination.⁵

The text of the draft Statute prepared by the eight-nation group had stipulated in Article II that the IAEA should ensure that the materials it supplied be used only for peaceful purposes. The group drafted provisions, couched in general terms, for inspections and other verification measures. When the twelve-nation group met, consisting of the original eight-nation group, plus the USSR, Czechoslovakia, Brazil and India, the USA put forward much more detailed proposals. The safeguards procedures it proposed were modelled on the safeguards prescribed in the numerous nuclear co-operation agreements that the USA was now concluding. These safeguards were to become the substance of Article XII of the Statute as it was finally approved.³

On the basis of the US proposals, the twelve-nation group decided that the IAEA would be authorized to:³

- Examine and approve the design of nuclear plants (but solely in order to verify that they would not further any military purpose, would comply with safety standards and would permit the application of safeguards) (Article XII.A.1).³
- Require the keeping of operating records (Article XII.A.3).³
- Call for and receive reports (Article XII.A.4).³
- Approve the means used for reprocessing spent fuel — but solely to ensure that reprocessing did not lend itself to diversion and complied with applicable safety standards — and require the deposit with the IAEA of “special fissionable material” (i.e. plutonium) surplus to that which the State concerned needed for reactors it was operating or constructing (Article XII.A.5).³
- Send inspectors to the “recipient” State or States, designated by the IAEA in consultation with the State(s). As noted, the inspectors “shall have access at all times to all places and data and to any person” dealing with nuclear items required to be safeguarded. The inspectors’ tasks would be to account for all nuclear material covered by the IAEA’s agreement with the State, and verify compliance with the State’s undertaking against “furtherance of any military purpose” and with any other conditions prescribed in the agreement with the State (Article XII.A 6).³

The IAEA would also have authority to require the observance of nuclear safety measures (Article XII.A.2). Its inspectors were also to verify that in the IAEA’s own operations it was complying with its own safeguards and safety measures (Article XII.B). Additionally, the inspectors would be required to report to the Director General any non-compliance (by a State) that their work might disclose. The Director General was required, in turn, to report the matter to the Board. If the Board confirmed that the State was not complying with its safeguards agreement it could call upon the State to comply forthwith. The Board would also be required to report the non-compliance to all Member

States of the IAEA and to the Security Council and General Assembly of the United Nations. The IAEA would also have the right to impose specified sanctions (Article XII.C).³

In 1991, the discovery of Iraq's clandestine weapon programme sowed doubts about the adequacy of IAEA safeguards, but also led to steps to strengthen them, some of which were put to the test when the Democratic People's Republic of Korea (DPRK) became the second country that was discovered violating its NPT safeguards agreement. The Three Mile Island accident and especially the Chernobyl disaster persuaded governments to strengthen the IAEA's role in enhancing nuclear safety.^{5,8}

The Conference on the IAEA's Statute

On 20 September 1956, the Conference on the Statute began at the United Nations Headquarters in New York. While the United Nations provided services and the venue, the Conference was an ad hoc meeting of the States concerned and not of the United Nations itself.³

While the Conference approved many clarifying amendments to the Statute, the final version of the Statute was essentially the same as the twelve-nation draft, with a slight shift in the balance of power towards the General Conference and a provision for a review of the Statute at the sixth General Conference in 1962 if a majority of the Member States so desired. One of the chief disagreements during the Conference on the Statute related to the proposals in the twelve-nation draft for the IAEA's safeguards, which several developing countries likened to neo-colonialism.³

On 23 October 1956, the Conference approved the complete text of the revised Statute. The ratification process began as soon as the Conference had come to an end. The Statute entered into force on 29 July 1957, when 26 States had deposited their instruments of ratification.³

The Statute outlines the three pillars of the Agency's work, namely nuclear verification and security, safety and technology transfer.⁵

Nuclear Security

The importance of having effective physical protection systems in place for nuclear and other radioactive materials has been highlighted by the threat posed by the well-publicized cases of illicit nuclear trafficking in the mid-1990s,⁹ and the terrorist attacks in 2001 in the USA.⁶ These incidents pointed to the possibility of unauthorized access to direct-use material and to potential weaknesses in the physical protection system. Moreover, although the potential for the smuggling of large quantities of weapons-usable material may be low, trafficking of small quantities of nuclear material of strategic value could cause fatal ionizing radiation exposure to individuals.⁹

Nuclear security consists of measures to prevent unauthorized access or damage to, and loss, theft or unauthorized transfer of, radioactive sources.⁷

The core characteristics and attitudes of the security culture include: facility leadership, proactive policies and procedures, personnel performance, and learning and professional improvement. Dedicated leadership within organizations entrusted with fissile materials

is one of the chief determinants of security. Top managers are responsible for developing and implementing a specific set of policies and procedures that shape the behaviour of their subordinates. Of particular importance to the core is a manager's emphasis on clear roles and responsibilities, visible security policies, cyberprotection, contingency plans and drills, and personal accountability. The security culture defines, among other things, the instinctive behaviour of personnel. An efficacious security culture expects employees to take an active, security-based stance in any situation in which nuclear material and/or the facility itself are at risk. They are expected to innovate, since risks are too numerous to predict and no amount of planning or policy making can account for all contingencies. This element is particularly important in view of growing and unpredictable terrorist threats. Security planning and management must be assigned a higher priority, as well. Educating both the workforce and the public and eliciting their support is the best way to assure that security receives the attention and resources commensurate with its importance.⁸

There exist external factors to an organization that contribute to the shaping of the behaviours and concrete attributes associated with the security culture. These include:⁸

- **International commitments and assistance.** Membership in relevant international agreements and forums is an important prerequisite for promoting nuclear security culture.⁸
- **National policies and leadership attitudes.** The behaviour of management and other personnel at a facility reflects the priority accorded nuclear security issues by the nation's leaders.⁸
- **Corporate and industry guidelines.** The industry, in cooperation with the relevant government agencies, is responsible for clarifying and updating current threat assessments, in addition to providing training, inspections, and quality assurance. Funding issues ranging from budgetary allocations to recommendations for private operators also fall under the purview of industry.⁸
- **The "design basis threat" (DBT) methodology** takes into account the capabilities, intentions, attributes, and characteristics of potential adversaries, as the approach to designing security measures. This methodology enables individual countries to develop their own national DBTs consistent with best practices and their national traditions and history.⁸
- **Security equipment** must be available through appropriate channels, meet national and international standards, and be affordable to allow sites with smaller budgets to sustain their efforts. The ultimate goal is to make maximum use of automated processes and procedures, thereby limiting the prospect of human error.⁸
- **Rules and regulations.**⁸ Nuclear security is based on agreements and guidance – the conventions, standards, guidelines, and recommendations that help national authorities control nuclear materials and nuclear-related activities.¹⁹ Texts of written directives must be up-to-date, succinct, and user-friendly. This is especially important for dissemination to personnel who do not routinely deal with security matters. The texts need to send a clear and unambiguous message.⁸

- **Deterrence through enforcement** refers to National governments' obligations to criminalize activities like theft, sabotage, unauthorized access, illegal transfers, and other malicious acts involving nuclear material that might lead to breaches of nuclear security.⁸
- **General public awareness.** The escalation of terrorism in recent years has created a political climate in which the public is receptive to security concerns. Well-tailored outreach efforts can convince the public that breaches of security could jeopardize the safety of nuclear facilities, and even their own lives. A public that starts caring about nuclear security will be more likely to report attempts at diversion and terrorism, and report inadequate security perimeters or the presence of suspicious people near a facility, or other conditions that could contribute to a breach of security.⁸

The ultimate goal of security culture is to contribute to the efficient protection of nuclear material by contributing to a security-conscious work environment.⁸

Nuclear Safety vs. Nuclear Security

Nuclear Safety comprises the measures intended to minimize the likelihood of accidents involving radioactive sources and, should such an accident occur, to mitigate its consequences.⁷ Although safety and security have much in common, at times their requirements are at odds. Experiences indicate that field presence is a vital part of a strong safety culture, both in terms of helping staff meet standards and in spotting equipment and other problems. Thus, reduced accessibility under security pressures may be undesirable. There can also be an occasional issue when access to a safety-critical area has to be kept locked for security reasons when it would be safer to keep it unlocked.⁸ This ambiguous relationship is captured in the IAEA document, "The Physical Protection of Nuclear Material and Nuclear Facilities," (INFCIRC/225/Rev.4) which asserts that: "Safety specialists, in cooperation with physical protection specialists, should evaluate the consequences of malevolent acts, considered in the context of the State's design basis threat, to identify nuclear material, or the minimum complement of equipment, systems, or devices to be protected against sabotage. Potential conflicting requirements, resulting from safety and physical protection considerations, should be carefully analyzed to ensure that they do not jeopardize nuclear safety, including during emergency conditions."⁶

The tension between the security and the safety cultures arises because they embody two fundamentally different approaches to enhancing the operational reliability of vital systems, equipment, and components. Proponents of safety typically call for building increased redundancy into at-risk systems. Proponents of the security culture, on the other hand, point out that greater redundancy might render these systems, equipment, and components even more vulnerable. Increased redundancy might also create a situation in which there are more components and equipment than can affordably be secured against malicious acts, making security costlier and more elusive.⁸

Nevertheless, these two concepts can be mutually reinforcing. Despite occasional tension between the creeds of the security and safety cultures, the former is emerging as a distinct and important approach to enhancing physical protection, and conversely, the

characteristics of a good security culture would likely result in improved safety, quality, and productivity within the organization, since closer attention to personnel performance tends to produce better results in every area.⁸ The relationships and synergies between security, safety and safeguards should be recognized and taken into account in the development of nuclear security programmes.⁶ Safety and security specialists need to work closely together in the identification and protection of vital areas of nuclear facilities. When protecting vital areas, physical protection measures and engineering safety measures work in parallel to minimize the possibility of an uncontrolled radioactive release.¹⁹ The strengthening of the safety of radioactive sources also enhances the security of such sources.¹⁶

In an effort to promote both safety and security culture with respect to radioactive sources, thereby protecting individuals, society and the environment, the IAEA has developed the "Code of Conduct on the Safety and Security of Radioactive Sources," (2004) urging every State to take appropriate measures to achieve and maintain a high level of safety and security of radioactive sources, prevent unauthorized access or damage to, and loss, theft or unauthorized transfer of, radioactive sources, and mitigate or minimize the radiological consequences of any accident or malicious act involving a radioactive source.^{7,15} This document defines security culture as "characteristics and attitudes in organizations and of individuals which establish that security issues receive the attention warranted by their significance."⁷

The IAEA is making significant efforts to bring together safety and security specialists from around the world to develop guidance in addressing the key issues related to the sabotage of nuclear facilities.¹⁹ However, the IAEA has not yet issued detailed guidance or recommendations regarding the concept of nuclear security cultures, its content, or ways to make it a reality.⁸

The Role of the IAEA in the Physical Protection of Nuclear Material

International Instruments

The possible use of nuclear material for non-peaceful purposes underlines the need for the physical protection⁹ of nuclear power plants, laboratories, and other facilities.⁸ Effective systems are therefore required to protect nuclear material and facilities from theft and sabotage. Although, the responsibility for ensuring that such systems are properly established and operational rests with governments, physical protection of nuclear material is also of international concern since incidents in one State can have ramifications across borders. The international community, therefore, has a legitimate interest in the fulfilment by States of their physical protection responsibilities.⁹

The IAEA, its Member States and international organizations have been⁹ aggressively promoting the concept of a nuclear security culture as a tool to improve the physical protection of nuclear material,⁸ as well as providing increased attention to activities against illicit trafficking of nuclear material and other radioactive sources,⁹ to prevent the malicious use of nuclear and other radioactive material and the sabotage of nuclear

installations.⁶ To this end, the international community has taken several initiatives, such as:

- The IAEA Nuclear Security Plan of Activities;
- The UN Security Council Resolution 1373⁶(2001), calling for all States to become parties as soon as possible to the relevant international conventions and protocols relating to terrorism, and emphasizing the need to strengthen a global response to the challenge of illegal movement of nuclear material;¹⁶
- The UN Security Council Resolution 1540;
- The Convention on the Physical Protection of Nuclear Material (CPPNM),⁶ which entered into force in 1987,¹⁰ aimed at ensuring the protection of nuclear material, as far as practicable, during international nuclear transport;¹⁵
- The Code of Conduct for the Safety and Security of Radioactive Sources (Code of Conduct)⁶, a non-binding international legal instrument that applies to civilian radioactive sources that may pose a significant risk to individuals, society and the environment;¹⁵
- The G8 Global Partnership against the Spread of Weapons and Materials of Mass Destruction;
- The EU Strategy against the Proliferation of Weapons of Mass Destruction; and
- The Global Threat Reduction Initiative, aimed at preventing nuclear or other radioactive material from falling into the hands of criminals and terrorists.⁶

The growing threat of catastrophic terrorism and other new security challenges have made it clear that the scope of nuclear security and the associated culture need to extend beyond the traditional task of protecting weapons-usable materials at their sites. Radioactive sources must be rigorously protected while undergoing transport, storage, or handling for a variety of other purposes. Therefore, the IAEA Advisory Group on Nuclear Security recently embraced a new and wider understanding of nuclear security, defining it as "the prevention and detection of and response to theft, sabotage, unauthorized access, illegal transfer, and other malicious acts involving nuclear material, other radioactive substances, or their associated facilities." This understanding of nuclear security is largely consistent with the guidelines set forth in the United Nations Security Council Resolution 1540, in April 2004, which seeks to prevent the spread of weapons of mass destruction (WMD) (these include nuclear, chemical and biological weapons) to non-State actors. This resolution is innovative in that, for the first time, a document of this type offers a comprehensive vision of what is needed to curb the supply side of the proliferation problem. The main body of the resolution requires all U.N. member states to:^{8,11,16}

- "...refrain from providing any form of support to non-State actors that attempt to develop, acquire, manufacture, possess, transport, transfer or use nuclear, chemical or biological weapons and their means of delivery;"¹¹
- "...adopt and enforce appropriate effective laws which prohibit any non-State actor to manufacture, acquire, possess, develop, transport, transfer or use nuclear,

chemical or biological weapons and their means of delivery, in particular for terrorist purposes, as well as attempts to engage in any of the foregoing activities, participate in them as an accomplice, assist or finance them;”¹¹

- “...take and enforce effective measures to establish domestic controls to prevent the proliferation of nuclear, chemical, or biological weapons and their means of delivery, including by establishing appropriate controls over related materials.”¹¹
To this end, States are obliged to implement a variety of accountancy and control measures; physical protection measures; border controls; measures to detect, deter, prevent and combat illicit trafficking; and import and export control measures;¹⁶
- “promote the universal adoption and full implementation, and, where necessary, strengthening of multilateral treaties to which they are parties, whose aim is to prevent the proliferation of nuclear, biological or chemical weapons;”¹¹
- “adopt national rules and regulations, where it has not yet been done, to ensure compliance with their commitments under the key multilateral non-proliferation treaties;”¹¹
- “renew and fulfil their commitment to multilateral cooperation, in particular within the framework of the International Atomic Energy Agency, ...as important means of pursuing and achieving their common objectives in the area of non-proliferation and of promoting international cooperation for peaceful purposes;”¹¹
- “develop appropriate ways to work with and inform industry and the public regarding their obligations under such laws;”¹¹
- “promote dialogue and cooperation on non-proliferation so as to address the threat posed by proliferation of nuclear, chemical, or biological weapons, and their means of delivery;”¹¹
- “take cooperative action to prevent illicit trafficking in nuclear, chemical or biological weapons, their means of delivery, and related materials.”¹¹

These measures closely mirror the structure and activities of the Agency’s Nuclear Security Plan. In particular, the resolution focuses on the prevention/detection element of nuclear security.¹⁶

The Development of the IAEA’s Nuclear Security Programme

Physical protection against the theft, sabotage, unauthorized access or manipulation, illegal transfer of nuclear material, other radioactive substances, or their associated facilities has long been a matter of national and international concern.^{6,12} World reaction to these threats included the development of treaties and conventions designed to criminalize “acts, methods and practices” used by those threatening world peace and security. The year 1963 marked the first such ‘anti-terror’ convention. As terrorist “acts, methods and practices” evolved, illicit trafficking in, and possession of, nuclear materials became one of many significant international concerns. During the early 1990’s, alarm over terrorist use of nuclear-type methods of anti-social expression was fuelled by an evident increase in the availability of nuclear materials emanating from the former Soviet Union.¹³

The first instance of recognition by competent authorities that an IAEA convention had relevance in the anti-terrorism arena occurred in 1987, when the United Nations General Assembly resolution, “Measures to Prevent International Terrorism.”¹³

“...recall(ed) the existing international conventions relating to various aspects of the problem of international terrorism, inter alia, the Convention on Offences and Certain Other Acts Committed on Board Aircraft, signed at Tokyo on 14 September 1963, the Convention for the Suppression of Unlawful Seizure of Aircraft, signed at The Hague on 16 December 1970, the Convention for the Suppression of Unlawful Acts against the Safety of Civil Aviation, concluded at Montreal on 23 September 1971, the Convention on the Prevention and Punishment of Crimes against Internationally Protected Persons, including Diplomatic Agents, adopted at New York on 14 December 1973, and the International Convention against the Taking of Hostages, adopted at New York on 17 December 1979, as well as the Convention on the Physical Protection of Nuclear Material, adopted at Vienna on 3 March 1980...”¹³

Moreover, the General Assembly added:¹³

“Convinced of the importance of the observance by States of their obligations under the relevant international conventions to ensure that appropriate law enforcement measures are taken in connection with the offences addressed in those conventions,... requests the other relevant specialized agencies and intergovernmental organizations, in particular the Universal Postal Union, the World Tourism Organization and the International Atomic Energy Agency, within their respective spheres of competence, to consider what further measures can usefully be taken to combat and eliminate terrorism... Urging all States to take effective measures, in accordance with established principles of international law, in order that all acts, methods and practices of international terrorism may be brought to an end...”¹³

The language of this resolution reveals that the General Assembly was cognizant of the fact that terrorist’ “acts, methods and practices” included non-peaceful use of the atom.¹³

The UN General Assembly, again in 1989 and 1991, recognized the IAEA’s role in combating terrorism with the inclusion of the following text in its Resolutions:¹³

“...requests the other relevant specialized agencies and intergovernmental organizations, in particular the International Maritime Organization, the Universal Postal Union, the World Tourism Organization, the International Atomic Energy Agency and the United Nations Educational, Scientific and Cultural Organization, within their respective spheres of competence, to consider what further measures can usefully be taken to combat and eliminate terrorism.”¹³

Between 1988 and late 1992, the world witnessed an important shift of political philosophies in nearly every region of the globe. Events in Somalia, the former Yugoslavia and the Gulf War further contributed to thinning out resources and dulling the focus on terrorism. This fast-changing landscape captured world attention on many levels and diverted attention away from the increasing dangers of extremism and terrorism. The focus on terrorism was sharpened again during the morning hours of 26 February 1993, when a terrorist bomb detonated in New York City.¹³

On 9 December 1994, at the UN General Assembly meeting in New York, Member States reaffirmed their unequivocal condemnation of all “acts, methods and practices” of terrorism as criminal and unjustifiable:¹³

“...convinced of the desirability for closer coordination and cooperation among States in combating crimes closely connected with terrorism, including drug trafficking, unlawful arms trade, money laundering and smuggling of nuclear and other potentially deadly materials, and bearing in mind the role that could be played by both the United Nations and regional organizations in this respect;¹³

...stressing the imperative need to further strengthen international cooperation between States in order to take and adopt practical and effective measures to prevent, combat and eliminate all forms of terrorism that affect the international community as a whole,¹³

...recalling the existing international treaties relating to various aspects of the problem of international terrorism, inter alia, the Convention on Offences and Certain Other Acts Committed on Board Aircraft, signed at Tokyo on 14 September 1963, ... the Convention on the Physical Protection of Nuclear Material, adopted at Vienna on 3 March 1980,...”¹³

The General Assembly declared:¹³

“...Furthermore States that have not yet done so are urged to consider, as a matter of priority, becoming parties to the international conventions and protocols relating to various aspects of international terrorism referred to in the preamble to the present Declaration;¹³

...The United Nations, the relevant specialized agencies and intergovernmental organizations and other relevant bodies must make every effort with a view to promoting measures to combat and eliminate acts of terrorism and to strengthening their role in this field;”¹³

Six days later, the UN General Assembly affirmed its:¹³

“...confidence in the role of the Agency (IAEA) in the application of nuclear energy for peaceful purposes as well as ...call(ing) upon all States to take all necessary measures to prevent illicit trafficking in nuclear material, and welcomes the initiatives taken by the Agency to intensify international cooperation efforts in this respect...”¹³

This affirmative recognition by the General Assembly towards Agency’s responsibility for the suppression of trafficking in materials prompted the establishment of a new programme on Security of Materials. This programme continued to gain momentum resulting, among other things, in the establishment of a new Office of Physical Protection and Material Security. It was tasked to assist Member States in the protection of nuclear and other radioactive materials against theft and other criminal activities and provision of knowledge and tools for detecting and responding to incidents of trafficking. The programme included the management of the illicit trafficking database programme, the provision of training, guidance, expert assistance and equipment, peer review and co-ordination services, and other activities in support of the prevention and detection of, and response to, trafficking of radioactive materials.¹³

In September 2000, the IAEA General Conference adopted a resolution specifically identifying “Measures against Illicit Trafficking in Nuclear Materials and Other Radioactive Sources.”¹⁴ This was the first Agency resolution of its kind to include radioactive sources in addition to nuclear materials. The events of 11 September 2001, helped lead to increased demand by Member States for anti-terrorism assistance and the Agency, in response, intensified its assistance programme. During November 2001, the Director General, at the request of the General Conference, urged the Board of Governors to consider a proposal strengthening the work of the Agency.¹³ During March 2002, the Board of Governors approved in principle a strengthened plan to increase security of nuclear and other radioactive materials with the objective of preventing acts of terrorism.¹⁷

In September of 2004, the 48th General Conference in resolution (GC(48)RES/11) *inter alia* encouraged the Director General to prepare an annual report highlighting significant accomplishments of the previous year and establishing goals and priorities for the year to come to be submitted to the General Conference at its 49th session. During September of 2005, at its 49th session, the Board of Governors approved a new 4 year nuclear security plan covering 2006-2009.¹³

The IAEA’s Role and Objectives

The overall goal of the IAEA’s nuclear security activities is, upon request, to assist Member States in improving their nuclear security, thereby reducing the risk of a successful act of nuclear terrorism. Its role in achieving this goal consists of the following broad areas: facilitating the development of, and adherence to, legally binding and non-binding international instruments; developing international guidelines and recommendations acceptable to the international community; providing related assessment services, training, equipment and technical advice; and providing or facilitating exchange of information and related services.^{15,16}

To this end, the IAEA has established several advisory services to help Member States to assess the effectiveness and the need for improvement of their national physical oversight systems.

In light of the tragic events of September 11,¹⁸ and in response to increased concerns expressed by Member States,^{16,18} the Board of Governors approved in March 2002 a comprehensive, cross-cutting Nuclear Security Plan of Activities¹⁶ to strengthen the IAEA’s Nuclear Security Programme to embrace broader coverage, and to assist Member States in protecting their nuclear and radioactive materials against the emerging threat of terrorism.^{16,17,18} The programme combines the acceleration of existing Agency activities with¹⁶ the development of an extensive range of new measures to assist Member States, upon request, in the prevention, detection, and response to malicious acts, nuclear terrorism, and threats thereof, involving nuclear and other radioactive materials and their associated facilities and transports.^{15,16} This Plan builds on, accelerates and expands a number of existing IAEA activities under a single coordination. The Plan focuses on eight key activity areas:

1. Improving the physical protection of nuclear material and facilities;

2. Detecting malicious activities involving nuclear and other radioactive materials; strengthening States System of Accountancy and Control (SSACs);
3. Strengthening the security of radioactive materials other than nuclear material;
4. Assessing the security/safety vulnerabilities of nuclear facilities;
5. Responding to malicious acts and threats;
6. Ensuring compliance with international agreements and guidelines; and
7. Coordinating information on nuclear security.¹⁹

The Plan is built around a comprehensive approach that includes both prevention and detection of nuclear terrorism and appropriate response should it happen. The IAEA is also working to articulate emergency measures.¹⁹ On prevention, the Plan supports a number of key activities, including: nuclear security evaluation and appraisal missions; implementing security upgrades, including through bilateral support; expert missions aimed at securing “orphaned” radioactive sources; and developing of national strategies for locating and securing sources.^{15,19}

In the area of detection, the Plan aims to further strengthen capabilities of the authorities controlling border crossings; to validate instruments used for detection; and to supply detection instruments to Member States through Agency programmes and bilateral support.¹⁹

To respond to terrorist attacks, the Plan is helping the Agency and States to prepare emergency response arrangements, through improved planning and methodology development. This also includes assisting in the transportation of samples, and making nuclear forensics analysis available to numerous States.¹⁹

In 2002, the Office of Nuclear Security was established, within the framework of this new enhanced approach, to coordinate and facilitate implementation of the Plan. The IAEA Office of Nuclear Security plays a leading role in the planning, implementation, and evaluation of the IAEA’s nuclear security activities. The Office is also responsible for the allocation of resources provided by a specific extrabudgetary fund, called the Nuclear Security Fund (NSF), which has been established by the IAEA Director General to support the Agency’s nuclear security programme. Additionally, the office provides technical assistance to States in their efforts to establish the necessary infrastructure to protect nuclear and other radioactive materials from theft and diversion, protect nuclear installations and transport against sabotage and other malicious acts, and to combat illicit trafficking in nuclear and other radioactive materials.¹⁷ Since its inception, the IAEA’s Nuclear Security Programme has provided direct assistance to over seventy-five countries, in the form of assessment missions, training courses, or support for development of national guidelines and regulations. The Agency has also successfully assisted Member States in obtaining much needed detection and other equipment for use in monitoring national borders. Additionally, several non-Member States have used IAEA standards or guidelines when creating their own security regulations and practices.¹⁸

The results and outcomes of implementing the Plan of Activities include: increased awareness in States of the importance of establishing an infrastructure, including

regulatory systems, in support of nuclear security; improved preparedness in States to address the risk of malicious acts; increased legal commitments; more States joining the Illicit Trafficking Data Base; enhanced capacity of Member States to address nuclear security issues through training and education activities held in all regions and reaching some 1500 participants; enhanced radiation monitoring capabilities established at borders. More than 100 evaluation missions have been conducted, including for overall assessment of needs, physical protection evaluation, vulnerability assessment and follow-up to previous activities and missions. The needs assessment and evaluation missions have indicated the necessity for a significant number of improvements. As a result of the missions, the physical protection of several nuclear facilities has been improved, and complementary support has been provided through bilateral programmes. A substantial number of vulnerable, high-activity radioactive sources have been secured. Also, detection capacity has improved at several border-crossing points.¹⁶

As earlier mentioned, the Agency Board of Governors has approved a new plan for supporting IAEA Member States in their efforts to establish and maintain effective national nuclear security regimes. The Nuclear Security Plan 2006-2009 was approved in September 2005 and will follow the completion of the three-year Plan of Activities which was approved by the IAEA Board in 2002.¹⁵

The primary objective of the new Plan is to provide, upon request, assistance to IAEA Member States to help them in their efforts to establish, maintain and sustain an effective national nuclear security framework.¹⁵ It is important that the new Nuclear Security Plan respond to emerging priorities and rapidly changing events. To achieve this, a simplified structure that emphasizes efficiency and flexibility has been adopted.¹⁶ The Plan will improve States' capabilities through the provision of guidelines and recommendations, human resource development, expert services and implementation support. The activities include assistance to improve or establish national legislative and regulatory frameworks, physical protection, accounting and control, detection and monitoring capabilities, transport security, incident and emergency response measures, and nuclear security culture and sustainability.¹⁵

The Nuclear Security Plan 2006-2009 has three main activity areas. The first activity area, **Needs Assessment, Analysis and Coordination**, contains activities that underpin the entire Plan. The structured approach to nuclear security implementation requires effective information to support prioritisation, to monitor progress and to target new activities.^{15,16} The objectives of this activity area are:¹⁶

- having a comprehensive set of information which effectively supports implementation of the Nuclear Security Plan;¹⁶
- understanding nuclear security needs on a global scale to identify areas of cooperation between and among the Agency and Member States;¹⁶
- understanding illicit global trafficking trends and patterns, including theft and other malicious acts involving radioactive material;¹⁶
- fully protecting sensitive nuclear security information from disclosure;¹⁶
- fully coordinating the nuclear security support programmes of Member States and international organizations with those of the Agency;¹⁶

- having effective mechanisms of interaction with other international organizations.¹⁶

The second activity area, **Prevention**, covers IAEA activities that help States to protect nuclear and other radioactive material from malicious acts,^{15,16} such as theft and sabotage, carried out by terrorists or criminals.¹⁵ The objectives of this activity area are:¹⁶

- to enhance adherence or political commitments by States to the amended CPPNM, the Code of Conduct and other relevant international instruments;¹⁶
- to achieve effective protection, control, accountancy and registry of all nuclear and other radioactive material and associated facilities, as requested, within a State.¹⁶

The activities include assistance, upon request, to improve or establish national legislative and regulatory frameworks, physical protection, accounting and control, transport security, and nuclear security culture and sustainability.¹⁶

The third activity area, **Detection and Response**, covers assistance to help States to combat illicit trafficking — the “second line of defence” — and emergency response.^{15,16} Continued reports of illicit trafficking in nuclear and other radioactive material demonstrate the need for States to have detection and response capabilities in place. Since illicit trafficking and theft of nuclear material can lead to nuclear proliferation and the possible construction of improvised nuclear devices or Radiological Dispersal Devices (RDDs), measures to detect and respond to such acts are necessary components of a comprehensive nuclear security programme. The objectives are:¹⁶

- to enhance capabilities of States to detect, interdict and respond to illegal acts involving nuclear and other radioactive material and associated facilities;
- to make internationally accepted guidance and technical information available to States that will assist them, upon request, in their efforts to detect and respond to unlawful use/possession of nuclear and other radioactive material; and in their efforts to protect against and respond to nuclear terrorism at large public events.

The IAEA’s Nuclear Security Plan also covers other activities which support the objectives of nuclear security; e.g. State Systems of Accounting for and Control of nuclear material (SSACs), radiation and installation safety and the management of radioactive waste.¹⁵

Prevention of Nuclear Terrorism

In the wake of recent highly organized terrorist attacks in Kenya, Tanzania, the United States, Indonesia, Saudi Arabia, Morocco and numerous other nations, the international community has come to recognize that new and stronger measures must be implemented to protect against and prepare for a diverse array of terrorist scenarios.¹⁹

Measures to protect nuclear and other radioactive materials against theft or other forms of loss of control, illegal possession, smuggling, and unauthorized use, as well as those to protect nuclear installations and transport against sabotage and other malicious acts that can result in radiation exposure to the general public or the environment, constitute the first line of defence against nuclear terrorism, namely prevention.²⁰

In recent years, there has been great concern regarding terrorist attempts to steal a nuclear weapon, or to acquire the nuclear material necessary for constructing a nuclear device.

They might also try to acquire radioactive materials with the goal of making a Radiological Dispersal Device (RDD), or so-called “dirty bomb.” Terrorists could also consider initiating acts of sabotage against nuclear power stations, research reactors, storage facilities, or transport operations with the goal of spreading radioactive contamination.¹⁹

Given the multiplicity of targets and scenarios for terrorists, States must consider a comprehensive approach to combating nuclear terrorism. Some of the key priorities include:¹⁹

- adequate physical protection of all nuclear and/or radioactive materials, and facilities plus transport systems;¹⁹
- proper regulatory control of nuclear and radioactive material;¹⁹
- effective detection and interdiction of illicit trafficking in nuclear and radioactive materials;¹⁹
- integration of nuclear safety and security systems;¹⁹
- readiness for implementing emergency response plans.¹⁹

The Agency’s activities to assist States to strengthen their preventive measures include advisory and evaluation missions, education and training, development of methodology and nuclear security framework, support for international legal instruments, and technical upgrades and advice.²⁰

Since 1995, the International Physical Protection Advisory Service (IPPAS) has been helping Member States to strengthen and enhance the effectiveness of their physical protection of nuclear materials and facilities. The IPPAS assembles teams of international experts in physical protection, at the request of a Member States, to assess the State’s system, compare it with international standards and make recommendations for improvement.¹⁹

To assist States in the identification of the best means by which to enhance and strengthen their nuclear security, the Agency has initiated the International Nuclear Security Advisory Service (INSServ). The INSServ missions aim at identifying overall and specific needs for additional or improved security measures for nuclear-related activities of the State, whether involving nuclear material and facilities or other radioactive material, such as radioactive sources, and relevant facilities. Thereafter, these missions generate recommendations, which provide the platform for subsequent, more specific, nuclear security assistance, either through IAEA programmes or through bilateral support programmes, in strengthening and enhancing the effectiveness of their physical protection of nuclear materials and facilities. INSServ missions are not intended to provide detailed technical fixes to deficiencies.^{19,20}

Reliable accounting for and control of nuclear material is fundamental for States’ ability to fulfil their international nuclear non-proliferation obligations.²⁰ Clearly, the first line of defence in protecting nuclear materials is an effective State System for Accountancy and Control (SSAC) through which States have an exact knowledge of the quantities and location of their nuclear material. These systems help deter illegal activities because of the possibilities of timely detection of missing material. For this reason, inter alia, the

Agency has focused on the development and coordination of plans for technical support to establish and improve SSACs and physical protection systems. In addition to an SSAC, a comprehensive regulatory framework with adequate operational resources is also required in order to detect attempts of intrusion; delay access to the material; and activate preplanned response measures.^{9,19} The IAEA International SSAC Advisory Service (ISSAS) mission is a new initiative to provide national competent authorities and facility operators with recommendations and suggestions on improvements that could be made to their SSAC systems.²⁰ ISSAS support is available to all countries with nuclear materials and facilities. ISSAS missions compare the procedures and practises in Member States with the obligations specified under safeguards agreements, with international consensus guidelines and against equivalent practices in other countries.¹⁹

Additional recommendations concerning the Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Rev. 4) were issued in 1999. One major innovation in these recommendations is the importance attributed to the creation and operation of a “Design Basis Threat” (DBT) in implementing national physical protection programmes. The DBT Process helps States to define the characteristics of potential adversaries who might attempt the unauthorized removal of nuclear materials or sabotage in order to determine the physical protection measures required.¹⁹

The IAEA also offers the EPREV (Emergency Preparedness Review) service for Member States. Under this programme, international teams of experts conduct review of preparedness for nuclear or radiological emergencies in Member States on request of the host country. The EPREV programme provides an opportunity for emergency response planners in all countries to assist other planners through the dissemination of information on best international practices.¹⁹

Education and training are core elements of the preventive measures. They contribute to attaining sustainability of human resources tasked with the maintenance and enhancement of the States’ nuclear security systems. The Agency conducts a range of training activities relevant to prevention, including physical protection training courses, DBT workshops, and SSAC training courses and workshops.²⁰

In view of the increasing international concerns, the Agency has developed an Integrated Plan for Enhancing the Security of Research Reactors and their associated facilities. Since 1999, the IAEA has been helping to enhance the general safety of ageing research reactor facilities, and spent fuel storage, in selected countries of the former Soviet Union, and Eastern and Central Europe. The goal is both to reduce the risk of accidents and to improve the safety and security of such facilities.²⁰

In April 2005, the United Nations General Assembly adopted the International Convention for the Suppression of Acts of Nuclear Terrorism (Nuclear Terrorism Convention). The Nuclear Terrorism Convention was opened for signature on 14 September 2005. The Convention details offences relating to unlawful and intentional possession and use of radioactive material or a radioactive device, and use or damage of nuclear facilities. It also requires States Parties to adopt measures as necessary to criminalize these offences. It also requires “States Parties to make every effort to adopt appropriate measures to ensure the protection of radioactive material, taking into account relevant recommendations and functions of the Agency”.^{15,16}

As part of building a nuclear security framework, work is ongoing on the development of additional guidelines and recommendations. These include guidelines on the export-import of radioactive sources based on the provisions of the revised Code of Conduct on the Safety and Security of Sources; on the development and maintenance of a DBT; on the functional specifications for detection instruments; on identifying ‘vital areas’ in nuclear facilities; on the development of security culture; on the security of transport of radioactive sources; and on combating cyber attacks on nuclear installations. The Agency has initiated a Nuclear Security Series of Documents to provide a coherent and integral framework for documents related to nuclear security.²⁰

Detection of Illicit Trafficking

The second line of defence consists of effective capabilities to detect and prohibit unauthorized movement of nuclear and other radioactive materials both at borders and within States.²¹ Trafficking in nuclear material and other radioactive sources is a global concern.¹⁹

One component of the IAEA’s efforts to understand the character and extent of trafficking is the Illicit Trafficking Database Programme (ITDP), designed to keep track of the illegal movement of and trafficking in nuclear materials and other radioactive materials. ITDP assists Member States by informing them about current incidents, by facilitating the exchange of reliable information about incidents, and by identifying common trends that might assist in stemming the flow of illegal movements.¹⁹

To strengthen the detection capability, the Agency offers evaluation and advisory services, education and training, new and improved methodologies, and technical advice and support.²¹

The evaluation of States’ capabilities to combat illicit trafficking in nuclear and other radioactive materials constitutes an integral part of the International Nuclear Security Advisory Service (INSServ). The Agency also conducts evaluation missions to assess present capabilities at States’ borders to detect and respond to illicit trafficking in nuclear and other radioactive materials. These missions result in specific recommendations aimed at strengthening border detection capabilities.²¹

As in prevention, education and training,²¹ specifically of border and customs inspectors,¹⁹ are fundamental to the Agency’s efforts related to detection of unauthorized activities involving nuclear and other radioactive materials. The Agency’s training strategy is implemented on three layers: a) regional awareness seminars to combat illicit trafficking; b) regional focused training on methodologies and practices to detect nuclear and other radioactive materials in illicit trafficking, and c) specific training in using detection equipment provided as support. The Agency supports customs and other “front line” officers in their familiarization with detection and identification instruments by conducting two week-long intensive training sessions in cooperation with the Austrian Research Centre in Seibersdorf.²¹

It is recognized that many States lack necessary technical capabilities to detect unauthorized movement of nuclear and other radioactive materials. The Agency provides States, to a limited extent, with equipment for detection of smuggling of radioactive substances at borders through nuclear security and technical cooperation programmes.

The IAEA also facilitates provision of such equipment through bilateral support programmes.²¹

There is ongoing work on the implementation of the Coordinated Research Project (CRP) - “Improvement of Technical Measures to Detect and Respond to Illicit Trafficking of Nuclear and other Radioactive Materials.” The results of the CRP are expected to strengthen the capability of Member States to detect and respond to events of illicit trafficking in nuclear and other radioactive materials by supporting them with the selection, provision and installation of equipment and related support.²¹

The Agency has established a small Nuclear Security Equipment Laboratory (NSEL) at the Vienna headquarters. The detection instruments, which are provided to Member States through Agency programmes, are tested before delivery in the NSEL. The NSEL also maintains a full set of equipment for training on detection and response.²¹

Response to Malicious Acts and Threats

In the area of response to acts of nuclear and radiological terrorism, the Agency assists Member States in fortifying effective capabilities through training and technical support, and the development of guidelines and recommendations.²²

The response related training programme includes training courses and workshops on various aspects of emergency preparedness and response, including response to radiological emergencies, medical preparedness and response, emergency monitoring, and technical assessment of emergencies at reactor facilities.²²

Work is ongoing on the technical document on “Preparedness and Response for Malicious Acts involving Radioactive Material.” The document includes a planning methodology and, where appropriate, tools to assist national authorities involved in making arrangements for response to such incidents and potential radiological emergencies that may be the result of malicious acts.²²

In response to requests for assistance, the Agency performed response missions to a number of Member States. During these missions, the security of dangerous radioactive sources was evaluated, which resulted in advice on improvements, the initiation of improved physical protection of some of the sources, and the development of an agenda for further upgrading of relevant security arrangements.²²

Nuclear Security Coordination

The IAEA nuclear security Plan of Activities involves several Agency departments. Close coordination is required for an effective, consistent and coherent programme. The coordinating responsibility is assigned to the Office of Nuclear Security.²³

Strengthening nuclear security requires the effective use of resources to enhance impact of individual projects towards the same goal. To this end, the Agency has²³ continued to seek liaisons, collaboration and¹⁵ increase its efforts to coordinate its nuclear security activities with those of national bilateral support programmes especially where recommendations have been made to upgrade existing systems with new, or more effective, equipment, as well as with other²³ regional, transnational and¹⁵ international organizations including, the UN Security Council’s Counter Terrorism Committee

(CTC), Interpol, the World Customs Organization (WCO), Europol, the UN Conference on Disarmament, the United Nations Interregional Crime and Justice Research Institute (UNICRI), the Organization for Security and Co-operation in Europe (OSCE), the European Union, and the Universal Postal Union (UPU).^{15,16,23}

Additionally, the Agency interacts on a regular basis with those States providing financial and in-kind contributions to the implementation of the nuclear security plan.¹⁶

Activities Supporting Nuclear Security

Activities in the Agency's Nuclear Safety and Safeguards programmes are also recognized for their contribution to nuclear security. Implementation of these activities may be enhanced or accelerated for nuclear security purposes, respecting existing competencies throughout the Agency with a view to avoiding duplication and promoting effectiveness sustainability.¹⁶

The objectives of these activities are:¹⁶

- To achieve an effective and sustainable level of control of radioactive sources, commensurate with the risks that they pose while not impeding their beneficial use;¹⁶
- To achieve effective identification of sensitive targets for malicious acts in nuclear installations and the engineering measures that would reduce the risk;¹⁶
- To achieve effective State systems of accounting for and control of nuclear material.¹⁶

The nuclear safety activities in support of nuclear security aim to minimize radiation exposure and to protect people and the environment from a radiological release. Minimizing the risk of exposures and accidents involves safety control measures to prevent unauthorized access/damage to or loss/unauthorized transfer of radioactive sources. Safety measures, therefore, provide a foundation for additional security measures that would prevent malicious acts. Depending on the material, risks, and potential consequences, additional measures above those that are warranted to prevent inadvertent access or loss may be required.¹⁶

The activities in the safeguards programme supporting nuclear security focus on an effective State system of accounting for and control of nuclear material (SSAC).¹⁶

Challenges to Nuclear Security

In spite of the important progress made by the international community and individual States in their level of preparedness in preventing, detecting and responding to nuclear terrorism, this constitutes one of the greatest threats to society today. The periodic reports of illicit trafficking in nuclear and other radioactive material, as well as reports that terrorist organizations have shown interest in obtaining this material, make clear that there is no room for complacency.⁶ Deficiencies remain in the legal, administrative, and technical arrangements for controlling and protecting nuclear materials and radioactive sources in many countries.¹⁹ The political and economic consequences, as well as the health impacts, of a successful malicious use of radioactive material would be devastating. There is a distinct belief that the response to date is not commensurate with

the potential consequences of these threats. In facing these challenges, the international community must continue to work to identify specific threats, share and make the best use of the information available about illicit nuclear trafficking and other nuclear security related events, strengthen prevention against such acts, and maintain the confidentiality of the sensitive information involved.⁶

According to the U.S. Department of State, “the most immediate and important challenge facing the Nuclear Security Programme is to identify and clearly prioritize its goals and activities to address continuing global nuclear security concerns, and complement other activities of the Agency.” In order to define programme priorities, those involved with the future direction of the Nuclear Security Programme must be clear about the fundamental purpose of this programme. If the Agency pursues to identify those situations where the likelihood for nuclear terrorism is greatest, it will need more analytic capability and closer collaboration with Member States. The scope of the programme will have to be recalibrated to take into account the substantial efforts occurring outside the ambit of the IAEA.¹⁸

An additional challenge concerns the scope of the Nuclear Security Programme, namely whether the limited resources of the Programme are best allocated to assisting the maximum number of states, or whether its resources should focus more narrowly on cases of particular concern. On this regard, the United States believes that the Agency should continue to respond to requests for nuclear security assistance from Member States. At the same time, the IAEA should begin to assess where its limited resources can best be allotted to reduce the risk of malevolent use of nuclear or high-risk radioactive materials. That core effort should include development of a coherent Programme of assistance to Member States in implementing their obligations under an amended CPPNM and the IAEA Code of Conduct on the Safety and Security of Radioactive Sources.¹⁸

Although funding for the Nuclear Security Programme is vital, at present Member States have no formal obligation to contribute to the Nuclear Security Fund. Without predictable and reliable funding, Programme managers cannot effectively plan long-term activities. Equally important, they are hampered in their ability to recruit and retain experienced staff. Since most Nuclear Security Fund contributions are earmarked by donor states to specific geographic areas or activities, the ability to direct resources to real Programme needs is further limited.¹⁸

Another challenge, concerning the allocation of financial resources, lies in the coordination of the Nuclear Security Programme with bilateral Programmes of Nuclear Security Fund donor states. Duplications and redundancies should be avoided wherever possible. Nuclear Security Fund donors, including the United States, spend millions of dollars a year working with other nations to secure nuclear and radioactive materials around the world. The IAEA is a relatively new player in this arena, and it is in everyone’s interest to ensure that the work of the Nuclear Security Programme is coordinated with the major donor states. This may not be easy, but it is absolutely essential to achieve the most efficient and maximum use of limited resources.¹⁸

Finally, the Nuclear Security Programme needs to be more clearly defined and effectively coordinated within the Department of Nuclear Safety and Security. The IAEA has

struggled to coordinate safety and security in the most effective way since the Office of Nuclear Security was created. Therefore, the IAEA should remove redundancies in Member State assistance Programmes and ensure that the guidance provided to Member States is clear and practicable.¹⁸

Enhancing the Global Nuclear Security Framework

Provided the high priority of strengthening the Convention on the Physical Protection of Nuclear Material (CPPNM),⁶ a conference to consider and adopt proposed amendments to the CPPNM was held, in response to requests from 55 States parties, at IAEA Headquarters in Vienna, from 4 to 8 July 2005.¹⁵ On 8 July 2005, the Conference adopted an Amendment to the CPPNM, by consensus.^{15,24} Those amendments were encouraged by the increasing problem of global terror and wide recognition that nuclear, as well as other radioactive materials are in demand by sub-state actors as a means and tool of terrorism. The Amendment provides for an expanded regime. It extends the scope of the Convention to also cover the physical protection of nuclear material in domestic use, storage and transport against, inter alia, theft, smuggling and sabotage and the protection of nuclear material and facilities against sabotage. It also provides for expanded cooperation between States regarding rapid measures to locate and recover stolen or smuggled nuclear material, to mitigate any radiological consequences of sabotage and to prevent and combat relevant offences. In addition, the Amendment strengthens the previous Convention in the following three main areas: The first area relates to the effective physical protection of nuclear material and of nuclear facilities. The second area relates to the prevention and combating of offences relating to nuclear material and nuclear facilities worldwide. The third area relates to facilitating co-operation among States.¹⁵ An amended CPPNM can guide the integration and updating of the IAEA's existing programmes of assistance to States in the area of nuclear security and in the development of new initiatives.⁶

Coordination and cooperation ought to be implemented at the global, regional and bilateral levels. There is a recognized need to strengthen the coordination of the nuclear security work performed in bilateral cooperation programmes, regional partnerships and the activities of the IAEA and other international organizations. Limited resources are available, and coordination is needed to optimize the use of resources. Nuclear security is a matter of global concern; the work should include all countries in all regions, as appropriate, and promote sharing of experience and lessons learned. The broader challenges for the international community require new approaches and alliances between nuclear authorities, law enforcement and intelligence authorities and the scientific community.⁶

The IAEA has a leading role in the global efforts to improve the global nuclear security framework and to promote its implementation. The IAEA should continue and strengthen its services in nuclear security, including flexible and modular international advisory service missions, expert advice, training, and on a prioritized basis, the provision of equipment. A focus should be to enhance the sustainability of nuclear security programmes in Member States. The IAEA should continue its efforts to:⁶

- Support the full implementation of the CPPNM and the Code of Conduct;⁶

- Establish a comprehensive set of nuclear security guidelines and recommendations;⁶
- Help States improve their regulatory and technical nuclear security systems;⁶
- Coordinate its efforts with those of other bilateral or multilateral assistance programmes. This coordination can be ensured by means of integrated nuclear security support plans;⁶
- Advise Member States on the importance of becoming party to international instruments relevant to combating nuclear terrorism, and to help States as needed in their efforts in that direction;⁶
- Promote research and development on more effective nuclear security approaches and techniques;⁶
- Promote the enhanced exchange of nuclear security relevant information;⁶
- Take an active role to facilitate effective cooperation and coordination at the international and regional levels;⁶
- Establish a roadmap to identify and prioritize future activities. This could illuminate those IAEA Programme capabilities not being employed by Member States, and provide valuable insight into ways the Nuclear Security Programme could improve its outreach;¹⁸
- Intensify work with Member States that face a high risk of malicious acts;¹⁸
- Establish clear lines of communication between the Office of Nuclear Security, other parts of the Agency, and relevant partners;¹⁸
- Maintain a regular dialogue with donor and recipient states to monitor the effectiveness of the Nuclear Security Programme.¹⁸

Strengthening Nuclear Security in States

While the responsibility for nuclear security rests uniquely with each State, this is a matter of global concern. Therefore, international support and cooperation should provide States the required assistance in their efforts. Through programmes implemented by individual States and by the IAEA, awareness of the measures needed to address nuclear security for all activities involving nuclear or radioactive material has grown significantly over the past years. In many States steps have been taken towards improving regulatory infrastructure. The physical protection and accountability within many States have been improved. Some States and regions have also begun to establish a second line of defence based on radiation detection at border crossings, as well as to prepare measures for responding to a criminal act or terrorism. These efforts must continue and be strengthened globally.⁶

Extensive work was performed under the umbrella of the Tripartite Initiative, a multilateral effort between the IAEA, the Russian Federation and the United States for securing vulnerable radioactive sources in the former Soviet Union States. By the end of 2005, the dismantlement and relocation of the highest-risk radioactive sources in six countries was completed. A regional partnership was developed with the United States

and Australia for purposes of increasing awareness on the security of sources and training regulators and radioactive source users in Southeast Asia. A second regional source security partnership between India, the United States and the IAEA will provide a mechanism for the provision of training, instrumentation, technical support and awareness building within India and in other States. A third regional radiological security partnership was initiated with South Africa, the United States and the IAEA, specifically for recovering and securing disused, high-activity sources and training government institutions.¹⁵

Other priorities for strengthening nuclear security include continued efforts to enhance the prevention of terrorist acts; the physical protection and accountability of nuclear and other radioactive material in nuclear and non-nuclear use, in storage and transport, throughout the life cycle, in a comprehensive and coherent manner. A graded approach should continue be used under which more stringent controls are applied for material or activities that pose the highest risk; for example, particular attention should be given to high enriched uranium or plutonium.⁶

The work towards developing effective approaches, methodologies and equipment for prevention, detection and response must continue. Each provides an important contribution towards developing an effective national nuclear security programme.⁶

The fundamental principles of nuclear security include embedding a nuclear security culture throughout the organizations involved. By the coherent implementation of a nuclear security culture, staffs remains vigilant of the need to maintain a high level of security.⁶

The long-term sustainability of nuclear security efforts is a primary concern. The investments made in States, through their own efforts and through assistance programmes, must be sustained in order to continue to upgrade or maintain an adequate level of security, to ensure that the requisite operational and regulatory infrastructure is in place. While the level of threat may change from time to time, an effective level of nuclear security must be appropriately maintained.^{6,18}

Clear focus and concentrated efforts for the following actions are essential:⁶

- Accelerate efforts to develop and implement a fully effective global nuclear security framework based on prevention, detection and response;⁶
- The expeditious agreement among State Parties on amending the CPPNM;⁶
- Full implementation of the Code of Conduct and an enhanced CPPNM;⁶
- Enhanced cooperation and coordination at the global, regional and bilateral levels;⁶
- The IAEA assuming – and being resourced to deliver - a leading role, specifically for supporting the Member States, and for furthering international cooperation.⁶

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