IAEA
Atoms for Peace: The First Half Century
1957 - 2007

# Board of Governors
# General Conference

**GOV/2006/46-GC(50)/13**
Date: 16 August 2006

**General Distribution**
Original: English

**For official use only**

Item 6 of the Board's provisional agenda
(GOV/2006/50)
Item 15 of the Conference's provisional agenda
(GC(50)/1)

# Nuclear Security - Measures to Protect Against Nuclear Terrorism

*Report by the Director General*

## Summary


- At its meeting in March 2002, the Board of Governors considered the report entitled *Protection Against Nuclear Terrorism: Specific Proposals* (GOV/2002/10) and approved, in principle, the proposals for Agency activities in the area of nuclear security. The Board requested that the Director General should report periodically on progress made in implementation of the proposals and the funding thereof. This request has been met by reports GC(47)/17, GOV/INF/2004/1, GOV/2004/50-GC(48)/6 and GOV/2005/50 successively. At its meeting in September 2005, the Board of Governors expressed its support for a new Nuclear Security Plan 2006–2009 (GOV/2005/50), looked forward to a progress report on its implementation and expressed the view that the Secretariat could issue an annual report. The 49th General Conference also encouraged (GC(49)/RES/10) the Agency to prepare an annual report highlighting significant accomplishments of the prior year and establishing goals and priorities for the year to come. This report fulfils these requirements by providing a review of activities and achievements over the past year and also trends and priorities for the future.


## Recommended Action

- It is recommended that the Board of Governors:

  (a) Takes note of the Director General's report on Nuclear Security — Measures to Protect against Nuclear Terrorism;

  (b) Calls upon Member States to continue contributing, on a voluntary basis, to the Nuclear Security Fund (NSF), which was established by the Board in March 2002 as a sub-fund of the Extra budgetary Programme Fund of the General Fund;

(c) Transmits this Report to the General Conference with a recommendation that the Conference welcomes the Report by the Director General and calls upon States to contribute to the Nuclear Security Fund which is necessary for the continuation of the Agency's activities related to the measures to protect against nuclear terrorism.

# Nuclear Security - Measures to Protect Against Nuclear Terrorism

## Annual Report

*Report by the Director General*

## Executive Summary

1. The responsibility for nuclear security rests entirely with each individual State. International legal instruments provide a strategic framework and a common platform for States to work together to enhance their collective nuclear security. A new international nuclear security framework is emerging based on obligations contained in the Convention on the Physical Protection of Nuclear Material (CPPNM) and its Amendment, the International Convention for the Suppression of Acts of Nuclear Terrorism, the relevant Security Council resolutions and the non-binding Code of Conduct for the Safety and Security of Sources and its Supplementary Guidance. The obligations in safeguards agreements are part of this framework. The Agency is facing a considerable challenge in helping form the national and international response to these instruments and in supporting States' implementation efforts. The Agency facilitates the development of guidance and recommendations appropropriate to the implementation by States of these instruments. In consultation with Member States, new and revised recommendations and guidelines are being developed for publication in the IAEA's Nuclear Security Series. The first three were published during the year. Fourteen more are in various stages of development.

2. The Agency assists national efforts to enhance nuclear security through prevention measures - comprising both protection and risk reduction components - detection and response measures. The Agency helps Member States to identify needs through evaluation missions which are based upon the relevant international legal instruments and Agency guidelines and recommendations. During the period covered by this report, the Agency has carried out, at the request of the Member States involved, 31 International Nuclear Security Service (INNServ), International Physical Protection Advisory Service (IPPAS), Radiation Safety and Security of Radioactive Sources Appraisal (RaSSIA) and State System of Accountancy and Control Advisory Service (ISSAS) missions. These have provided invaluable inputs to developing Integrated Nuclear Security Support Plans (INSSP) which provide the basis for a comprehensive and sustainable approach to addressing specific national nuclear security needs. Thirty two INSSPs have been drafted and are in various stages of implementation.

3. The Agency's capacity building activities during the year included fifty international, regional and national security training courses with participants from 88 Member and Non-Member States; the procurement of 760 pieces of detection and monitoring equipment for 19 States in Africa, Asia, Europe and Latin America; the procurement of physical protection equipment to help five States to improve the security of their nuclear installations (including some nuclear power plants); and helping five States to improve the physical protection of locations containing high-activity radioactive sources.

The Secretariat assesses that these activities and upgrades have made a substantial contribution to enhancing nuclear security in Member States. This heavy programme of training courses will continue over the next year; in excess of 50 training events are scheduled on the forward plan.

4. The Agency has also assisted in developing Member States' capacity to respond to nuclear or radiological emergencies caused, inter alia, by a security event. A major contribution is the establishment of the IAEA Incident Emergency Centre (IEC) which has given the Agency a 24/7 capacity to respond in a timely way to meeting States' requests for assistance.

5. Risk reduction activities are an important component of the prevention strategy. Under the Tripartite Initiative, now completed, the Agency arranged for the safe and secure storage of a number of vulnerable high activity sources in the NIS States. Elsewhere, the Agency arranged the recovery of more than 100 high-activity and neutron sources in Africa, Central America, the Caribbean and Latin America. Take-back, conversion and de-commissioning activities, involving the Agency, are reducing the HEU fuel inventories at research reactors. Four/five further take-back shipments of fresh HEU fuel are planned. The first return of Russian-origin spent HEU fuel took place during the period covered by the report.

6. The Agency continued to cooperate with other international and regional organizations. A Cooperation Agreement was concluded with Interpol which will, inter alia, facilitate a cooperative project involving illicit trafficking data and its analysis. A second and third Joint Action was concluded with the European Union designed to secure nuclear and other radioactive material, and to enhance detection and response capabilities, in States in South Eastern Europe, Central Asia, the Caucasus, North Africa, the Middle East and Africa. Implementation is now proceeding apace.

7. The IAEA Illicit Trafficking Data Base has increased its membership with 91 States now participating. Analysis of the ITDB data is providing valuable insights into patterns and trends in illicit trafficking, into threats and risks and into trafficking methods and routes. The ITDB has the potential to provide indicators pointing to vulnerabilities in control and protection systems and in detection and monitoring systems and technologies. These would be an important contribution to prioritization of activities. Efforts to expand the membership of the ITDB and to increase the comprehensiveness of its data will continue.

8. Over 90% of the funding for the implementation of the Nuclear Security Plan continues to be provided through extra-budgetary contributions to the Nuclear Security Fund (NSF). In 2005, financial donations were received from 13 Member States, the European Union and one non-governmental organization. In addition, in-kind contributions were received from a number of Member States. Without such extra-budgetary assistance the Agency's nuclear security programme would, in most aspects, cease to function. Sustained adequate funding for the Nuclear Security Plan 2006–2009 is not assured. There is no guarantee that the Plan can be fully implemented. The Agency has developed some measures which will help prioritize activities; e.g. improved analysis and feedback, but there are limitations on the extent to what can be achieved. Furthermore, donors' requirements on the use of their funds and in-kind contributions remain. The Agency is working with donors to maximise, to the extent possible, its flexibility and ability to maintain an adequate balance in utilizing these resources.

9. Nuclear security is a cross-cutting activity. Synergies flow from cooperation and coordination with safety and safeguards related work. Joint safety and security missions are undertaken to evaluate national laws and regulations for the control of sources, engineering safety design reduces the vulnerability of vital areas to sabotage, systems for accounting and control of nuclear material deter and/or allow early discovery of theft, physical protection measures and measures to detect illicit trafficking contribute to non-proliferation objectives, and a comprehensive approach to the legislative

assistance programme which recognises the importance of the interface between security, safety and safeguards.

10. The Agency has made substantial progress in developing its programme performance support system. The Secretariat can now plan, monitor implementation and report on the large number of nuclear security projects, including to donor States on their individual contributions.

11. Improved coordination with donor States reduces the potential for overlaps and provides opportunities for work-sharing. Synergies are also being sought with other international organizations. These also provide opportunities for coordination and work-sharing based on the recognition of competences and mutually compatible objectives.

# A. Introduction

12. In March 2002, the Agency embarked on its first comprehensive programme to combat the risk of nuclear terrorism by assisting States in strengthening their nuclear security. Approved by the Board of Governors, the first three-year plan[1] described a programme of work encompassing eight Activity Areas. The achievements of the first nuclear security plan were detailed in the *Review of the Implementation of the Nuclear Security Plan of Activities: 2002–2005*[2] which was submitted to the Board of Governors and General Conference in September 2005.

13. In September 2005, the Board of Governors considered and approved a new Nuclear Security Plan covering the period 2006–2009[3]. The new Plan builds upon the accomplishments of the first Plan, reviews the threat picture as it has evolved since the configuration of the priorities and approach set in 2002, and promotes strengthened international instruments to combat nuclear terrorism. The Nuclear Security Plan 2006–2009 covers three activity areas: Needs Assessment, Analysis and Coordination; Prevention; and Detection and Response. Specifically, the new Plan prioritizes: provision of advice concerning the implementation of binding and non-binding international instruments; development of guidance and documents; review and assessment of needs; provision of support to States, as requested, for the implementation of nuclear security recommendations; and outreach and information exchange through databases, conferences, workshops and fellowships. Activities originally conceived for safeguards, and nuclear and radiation safety purposes, but which also support nuclear security objectives, are also covered in the Plan.

---

[1] *Protection Against Nuclear Terrorism: Specific Proposals* (GOV/2002/10).

[2] Included in *Nuclear Security–Measures to Protect against Nuclear Terrorism* (GOV/2005/50).

[3] Included in GOV/2005/50.

# B. Threats, Risks and Vulnerabilities

## B.1. Threats

14. The Agency's 2002 nuclear security programme was influenced by a re-assessment of the intentions, motivations and capabilities of terrorists and criminals, and the challenging of the assumption that radioactive material is self-protecting. Assessments issued by national authorities continue to conclude that terrorist groups have the ambition to acquire, and possibly use, unconventional weapons such as improvised nuclear explosive devices and radiological dispersal devices. Such assessments are given credence by public statements of intent made by those purporting to represent terrorist groups, by reports of attempts by terrorist groups to acquire nuclear and other radioactive material, and by various law enforcement activities which have interdicted or prevented attempts to acquire nuclear and other radioactive material.

15. Past events can be an indicator of future threats. Malicious acts, or attempted malicious acts, involving radioactive material and related facilities are not unknown and some Member States maintain reporting systems for such events. Allegations or indications that various terrorist/non-state groups have tried in the past to acquire nuclear and other radioactive material have been reported in open sources and indictments in criminal prosecutions of alleged members of terrorist groups have, in several cases, included such charges. Use of, or threats to use, radioactive sources for malicious purposes have been rare but not unknown. Sabotage of, or attacks or threats of attacks on, nuclear facilities also have occurred in the past but none of these reported events has resulted in dispersal of radioactivity.

## B.2. Risks and vulnerabilities

16. In addressing nuclear security, the Agency has identified the potential malicious acts: a stolen nuclear weapon; an improvised nuclear explosive device made from stolen nuclear material; a radiological dispersal device (RDD); and sabotage of, or attacks or threats of attacks on, installations, locations or transports containing nuclear or other radioactive material, which could result in its dispersal. These are independent of any assessment of terrorist intentions or capabilities.

17. The numbers of nuclear facilities and the quantities of nuclear material worldwide are a key component in assessing the global risk. With regard to nuclear material, there are 442 operating power reactors[4] worldwide and 248[5] research reactors in operation[6]. In addition, there are 18 conversion plants, 40 fuel fabrication plants, 7 re-processing plants, 13 enrichment plants, 89 separate storage facilities and 74 other facilities under safeguards[7]. Safeguarded facilities contain 641 Significant Quantities (SQs) of HEU and 11, 233 SQs[8] of separated plutonium (Pu) outside of reactor cores. Considerably more Pu is contained in irradiated fuel in reactor cores or in spent fuel. There are additional nuclear fuel cycle facilities and materials in nuclear weapon States and non-NPT States. In

---

[4] IAEA Power Reactor Information System (PRIS), http://www.iaea.org/programmes/a2/index.html.

[5] IAEA Research Reactor Data Base (RRDB), http://www.iaea.org/worldatom/rrdb/.

[6] An additional 240 research reactors are in the shut-down state.

[7] IAEA Annual Report 2005 (GC(49)/5).

[8] Ibid.

addition to the facilities, there are transports carrying fresh and spent fuel, radioactive waste and other nuclear material. The total amount of spent fuel is estimated to 190,000 tHM (tons heavy metal)[9]. To protect these facilities and this material from theft or sabotage present a formidable security challenge.

18. Data on illicit trafficking incidents collected by the ITDB since 1993 show a small number of instances which have involved various quantities - latterly small - of high enriched uranium (HEU) and one case involving weapons usable plutonium (Pu)[10]. Given the serious consequences of the detonation of an improvised nuclear explosive device, even small numbers of incidents involving HEU or Pu are of very high concern. The security of nuclear material, especially weapons-usable material has benefited from a sustained programme of national and international measures to enhance its security but trafficking incidents[11] involving nuclear material point to possible weaknesses and may be indicative of the illicit availability of larger undetected quantities.

19. There are a large number of radioactive sources in use or storage. The precise number is not known, but it is estimated that there are probably well in excess of 100,000[12] Category 1 and 2[13] sources and the number of Category 3 sources exceeds 1,000,000. In all, there may be over 3,000,000 sources worldwide. Many are not suitable for use in a simple RDD but estimates of how many might be used for malicious purposes are complicated by consideration of the disruptive and psychological effects of an RDD; immediate casualties and destruction are not the only considerations. There are, therefore, a large but unknown number of radioactive sources which could be used in an RDD. States participating in the ITDB have reported 535 confirmed incidents involving radioactive sources since 1993[14]. The large number of incidents indicates that measures to control sources are not adequate and that, for sources suitable for RDDs, security needs improvement.

# C. International Framework for Nuclear Security

20. The responsibility for nuclear security rests entirely with each individual State but events have clearly demonstrated the international dimension of a nuclear terrorist act. States recognize the need to work together to enhance their collective nuclear security. International legal instruments provide a strategic framework and a common platform for such cooperation. The Agency facilitates the development of guidance and recommendations appropropriate to the implementation by States of these instruments.

---

[9] Ibid.

[10] The incident, which occurred in 1994, involved 6.2 gm of material.

[11] States reported to the ITDB nine incidents involving nuclear material which had occurred between July 2005 and June 2006. One involved a small quantity of HEU but in circumstances of low security concern.

[12] There are no reliable comprehensive figures for the global inventory of radioactive sources. However, by combining information from various sources; e.g. the IAEA Directory of Radiotherapy Centres (DIRAC), the IAEA Directory of Gamma Processing Facilities in Member States, the IAEA data base on Food Irradiation Facilities produced by NAFA, TECDOC-620 *Nature and Magnitude of the Problem of Spent Radiation Sources*, and IAEA Bulletin 43/4/2001 *Security of Radioactive Sources,* it is possible to make some broad estimates.

[13] The Safety Standard '*Categorization of Radioactive Sources'* (RS-G-1.9) provides a ranking of radioactive sources in terms of their potential to cause early harmful health effects if the source is not safely managed or securely protected. Sources are classified into five categories: Category 1 sources are potentially the most dangerous and Category 5 are the most unlikely to be dangerous.

[14] For the period July 2005 –June 2006, States reported the occurrence of 71 incidents involving non-nuclear radioactive material (mostly radioactive sources), and two cases involving both nuclear and other radioactive material.

## C.1. Binding and non-binding legal instruments

21. During the period covered by this report significant progress was made in strengthening international legal instruments relating to nuclear security. Accordingly, the Agency has undertaken, in fulfilment of the objective stated in the Activity Area II of the Nuclear Security Plan, efforts to inform and advise States about the relevant international legal instruments, and to encourage adherence to and/or implementation of them.

22. In July 2005, 88 of the States Parties at that time and Euratom agreed by consensus to amend the **Convention on the Physical Protection of Nuclear Material** (CPPNM) of 1979. Once in force, the amended CPPNM will make it legally binding for States Parties to protect nuclear material and facilities in peaceful domestic use and storage, as well as in domestic and international transport. It will also provide for expanded cooperation between States regarding rapid measures to locate and recover stolen or smuggled nuclear material, mitigate any radiological consequences of sabotage, and prevent and combat related offences. The Amendment will enter into force after it has been ratified, accepted or approved by two-thirds of the States Parties. There are currently 119 States Parties, four of which have ratified the amendment. The General Conference encouraged[15] States Parties to ratify the Amendment and to act in accordance with the object and purpose of the Amendment until such time as it enters into force. It further appealed to all States that have not yet done so to adhere to the CPPNM and its Amendment as soon as possible.

23. In the **Code of Conduct on the Safety and Security of Radioactive Sources** (Code of Conduct) and its **Guidance on the Import and Export of Radioactive Sources** (Supplementary Guidance), States commit themselves, through appropriate legislation and regulations, to reinforcing the safety and security of radioactive sources by establishing effective controls, and to protect against, and ensure the timely detection of, the theft, loss or unauthorized use or removal of radioactive sources. The General Conference[16], recognizing that the Code is not a legally binding instrument, has urged States to write to the Director General that they fully support and endorse the Agency's efforts to enhance the safety and security of radioactive sources and are working toward following the guidance contained in the Code of Conduct. As of June 2006, eighty-three States have done so. The General Conference[17] has also endorsed the Supplementary Guidance on the Import and Export of Radioactive Sources and, whilst recognizing that it is not legally binding, encouraged States to act in accordance with the Guidance on a harmonized basis and to notify the Director-General of their intention to do so.

24. The requirements for accounting and control of nuclear material and for the establishment of the related systems contained in **Safeguards Agreements** and their **Additional Protocols** is also a major component in the international nuclear security infrastructure.

25. The **International Convention for the Suppression of Acts of Nuclear Terrorism** (Nuclear Terrorism Convention) was opened for signature on 14 September 2005. It details offences relating to unlawful and intentional possession and use of radioactive material or a radioactive device, and use or damage of nuclear facilities. Once in force, it will require States Parties to adopt measures as necessary to criminalize these offences. It will also require "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". As of July 2006, 107 States had signed the

---

[15] GC(49)/RES/10.B.

[16] GC(47)/RES/7.B.

[17] GC(48)/RES/10.D.

Convention and five had ratified it. It will enter into force following the deposit of the twenty-second instrument of ratification, acceptance, approval or accession.

26. United Nations **Security Council resolution 1540** (2004) obliges all States to adopt and enforce appropriate effective laws which prohibit non-State actors to manufacture, acquire, possess, develop, transport, transfer or use nuclear weapons, in particular for terrorist purposes, and to establish domestic controls to prevent the proliferation of nuclear weapons, including the establishment of appropriate controls over related material. 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. The resolution explicitly states that none of its obligations shall be interpreted so as to conflict with or alter the rights and obligations of States Parties to the Treaty on the Non-Proliferation of Nuclear Weapons or alter the responsibilities of the Agency. **Security Council resolution 1373** (2001), adopted under Chapter VII of the UN Charter notes with concern the close connection between international terrorism and, inter alia, the illegal movement of nuclear materials and emphasizes the need to enhance coordination of national, regional and international efforts in order to strengthen a global response to this serious challenge and threat to international security. The resolution obliges all States, inter alia, to criminalize assistance for terrorist activities, deny financial support and safe haven to terrorists and exchange information for the prevention and prosecution of criminal acts.

## C.2. Nuclear security guidance

27. Pursuant to the objectives of Activity Areas II and III of the Nuclear Security Plan, the Agency facilitates the development, in cooperation with its Member States and other international organizations, the development of guidance and recommendations appropropriate to promote the implementation by States of the international binding and non-binding international legal instruments.

28. The **IAEA Nuclear Security Series** of publications provides guidance for the prevention and detection of, and response to, theft, sabotage, unauthorized access and illegal transfer or other malicious acts involving nuclear material and other radioactive substances and their associated facilities. Publications in the Series are issued in the following four categories: **Nuclear Security Fundamentals**, containing objectives, concepts and principles of nuclear security and provide the basis for security recommendations; **Recommendations**, presenting best practices that should be adopted by Member States in the application of the Nuclear Security Fundamentals; **Implementing Guides**, providing further elaboration of the Recommendations in broad areas and suggest measures for their implementation; and **Technical Guidance**, comprising Reference Manuals, with detailed measures and/or guidance on how to apply the Implementing Guides in specific fields or activities; Training Guides, covering the syllabus and/or manuals for Agency training courses in the area of nuclear security; and Service Guides, which provide guidance on the conduct and scope of Agency nuclear security advisory missions.

29. International experts are assisting the Secretariat in drafting these publications. For Nuclear Security Fundamentals, Recommendations and Implementing Guides, the Agency arranges open-ended technical meetings to provide Member States and the relevant international organizations with an opportunity to review the draft text. To ensure a high level of international review and consensus, the draft text is then submitted to all Member States for formal review. Technical Guidance publications are also developed in close consultation with international experts. Technical meetings are not required, but may be conducted, when necessary, to obtain a broad range of views.

30. The process for drafting and reviewing publications in the Nuclear Security Series takes account of confidentiality considerations and recognizes that nuclear security is inseparably linked with general and specific national security concerns. An underlying consideration is that related Agency

safety standards and safeguards requirements should be taken into account in the technical content of the publications.

31. The first three documents in the Nuclear Security Series are Technical Guidance and were published in the first half of 2006. The first of these documents is based on work undertaken under the related Coordinated Research Project "Improvement of Technical Measures to Detect and Respond to Illicit Trafficking of Nuclear Material and other Radioactive Material". Nuclear Security Series No. 1, entitled ***Technical and Functional Specifications for Border Monitoring Equipment***, provides an internationally agreed upon set of technical specifications that can be used in design testing, qualifying and purchasing border radiation monitoring equipment. The specifications provided are suitable for practical use by operators and front-line officers, in addition to testing equipment in an academic or laboratory setting prior to its deployment.

32. Nuclear Security Series No. 2, entitled ***Nuclear Forensics Support***, responds to the increasingly important role of nuclear forensics and nuclear forensic interpretation in the investigative efforts that follow the seizure of nuclear material in illicit trafficking events. The publication deals with these techniques in a comprehensive manner, summarizing tools and procedures that have heretofore only been available in different areas of the scientific literature. Its objective is to provide national policy makers, decision makers and technical managers with consolidated guidance for responding to incidents involving the interdiction of nuclear and other radioactive material, when nuclear forensic investigations are required. It also includes procedures for requesting support, when the need arises.

33. Nuclear Security Series No. 3 is titled ***Guidelines for Monitoring of Radioactive Material in International Mail Transported by Public Postal Operators***. This publication recognizes that the international postal network could be used as a vehicle for the illicit trafficking of nuclear and other radioactive material. It brings together a concise but comprehensive description of the various techniques and equipment used to detect and control radioactive material during mail processing. It also incorporates the experience accumulated by various public postal operators throughout the world and experience gained in dealing with cases of illicit events involving nuclear or other radioactive material. This document was developed in cooperation with the Universal Postal Union (UPU) and the World Customs Organization (WCO).

34. A further 14 documents are in various stages of development and will be eventually published as part of the Nuclear Security Series[18].

# D. Helping States to Identify Security Needs and Solutions

35. Nuclear security missions, evaluations and technical visits continue to be the Agency's main tool for helping States to assess their nuclear security needs, and provide a basis for formulating plans of action for improving nuclear security. Such missions have increased the Agency's understanding of both global and national nuclear security needs thereby meeting the objectives stated in Activity Area I of the Nuclear Security Plan. Security needs identified by such missions can be subsequently addressed by the State alone, or addressed in conjunction with Agency support, or addressed with the assistance of a bilateral partner. The Agency is also strengthening its contribution to the coordination of these activities.

---

[18] See Annex 1 of this report for details of documents in preparation.

36. The **International Nuclear Security Service (INSServ)** mission serves as a flexible mechanism to help identify a State's broad nuclear security requirements and the measures needed to meet them. During 2005, six States received INSServ missions. Two have been held so far in 2006 and more are planned. The INSServ Report, once agreed by the host State, serves as the basis for nuclear security cooperation between the Agency and the State and, with the consent of the State, as a vehicle for the coordination of bilateral nuclear security assistance.

37. The **International Physical Protection Advisory Service (IPPAS)** missions continue to serve as the Agency's chief tool for evaluating existing physical protection arrangements in Member States. IPPAS missions carry out detailed reviews of the legal and regulatory basis for the physical protection of nuclear activities in the requesting State and of compliance with obligations contained in the CPPNM. They also compare the established national practices with the guidance provided in IAEA documents[19] as well as with international best practices. The findings of IPPAS missions are formulated into confidential mission reports for further action on a multilateral, bilateral or unilateral basis. Specific IPPAS follow-up assistance such as training, technical support and more targeted assessments continue to constitute an essential feature of this advisory service. Between mid-2005 and mid-2006, seven States hosted IPPAS missions bringing the total number of IPPAS missions to 39. Two additional IPPAS missions are scheduled for later in 2006.

38. The **IAEA SSAC Advisory Service (ISSAS)** provides requesting national competent authorities with recommendations and suggestions for improvements to their State systems for accountancy and control (SSACs) of nuclear material. An ISSAS mission was carried out in East Asia in summer 2005. The mission evaluated the regulatory, legislative, administrative and technical components of the SSAC at both the State and facility level, and assessed how the SSAC met the obligations contained in the State's safeguards agreement and additional protocol as applicable. Three more ISSAS missions are in the preparatory stages.

39. The **Radiation Safety and Security of Radioactive Sources Appraisal (RaSSIA) missions** assess the effectiveness of a State's existing national regulatory infrastructures for radiation safety and security of radioactive sources against established international radiation safety standards, including the Code of Conduct, guidelines, recommendations and best practices. Member States receive, for their endorsement, a comprehensive and objective assessment of the current status of their regulatory infrastructures together with an action plan, if appropriate, designed to bring the regulatory infrastructure up to international standards and those specified in the Code of Conduct. Between June 2005 and June 2006, RaSSIA missions were performed in 15 States. Upon request, the Agency provides assistance in implementing the action plans prepared during the RaSSIA missions. Such assistance has included training packages on authorisation and inspection of radiation sources and the provision of the appropriate tools for the control of radioactive sources.

40. The Agency continued to convene **International Team of Experts (ITE)** advisory missions as a primary mechanism to reach out to States regarding their adherence to or implementation of international instruments relevant to enhancing protection against nuclear terrorism. An ITE mission to several States in South-Eastern Europe and the Caucasus is scheduled for October 2006. During the year, the Agency introduced a modular evaluation service, the **Integrated Regulatory Review Service (IRRS),** to help States to improve the effectiveness of national regulatory bodies and to implement national safety legislation and regulations. The outcome can also have a beneficial effect on the security infrastructure.

---

[19] *The Physical Protection of Nuclear Material and Nuclear Facilities* (INFCIRC/225/Rev.4 (Corr.)) and *Physical Protection Objectives and Fundamental Principles* (GOV/2001/41).

# E. Integrated Nuclear Security Support Plans

41. The Agency has taken steps towards consolidating States' nuclear security needs into integrated plans for nuclear security improvements and assistance. The Agency drafts, in consultation with the hosting State, an integrated plan, referred to as an **Integrated Nuclear Security Support Plan (INSSP)**, tailored to the State's specific needs on the basis of findings and recommendations from the Agency's range of nuclear security missions, supported and supplemented by other Agency information. The establishment of the INSSP mechanism has brought ad hoc interventions into a systematized approach.

42. As a mechanism, an INSSP provides a platform for nuclear security work to be implemented over a period of time, ensuring sustainability. All needs are included irrespective of how the need is fulfilled. The INSSP enables the Agency, the State concerned and any donors financing the work to plan and coordinate the activities from both a technical and a financial point of view, optimizing the use of resources and avoiding duplications. It also enables some States to prepare and implement the necessary nuclear security improvements internally and without external assistance.

43. A typical INSSP presents six components of work related to nuclear security: Legal and Regulatory Framework, Prevention, Detection, Response, Human Resource Development and Follow up. The INSSP identifies the responsible entities and organizations within the State as well as the timeframe for the implementation. In total, 32 INSSPs have been drafted by the Agency. A thorough process of establishing a comprehensive plan requires close interaction with the Member States. The Agency is now accelerating the processes to establish and implement INSSPs.

# F. Capacity Building

44. Capacity building continues to be a cornerstone in the Agency’s Plan. The improvement of existing technical systems in States and human resource development are main objectives of the Agency’s Nuclear Security Plan. Training in connection with upgrades of equipment/facilities, with the guidance and recommendations of Nuclear Security Series of publications, and with the binding and non-binding international legal instruments is an essential part of capacity building for the establishment of sustainable resources in nuclear security at the national and regional levels. A total of 51 training courses and workshops were organized in the field of nuclear security during the period covered by this report with participants from 88 Member and Non-Member States. The Secretariat assesses that these upgrades and training activities made a substantial contribution to enhancing the capacity of Member States to prevent, detect and respond to incidents involving nuclear or other radioactive material

## F.1. Human resource development

### F.1.1. Prevention

45. To assist States establish and maintain effective physical protection of nuclear and other radioactive material, a variety of training opportunities were offered. During the period, 19 national, 13 regional and one international training course were held on prevention, and more than 800 participants were trained from 70 States. The main topics were basic security objectives and fundamental principles, basic and advanced understanding of physical protection and a systematic

methodology to design and evaluate physical protection systems for nuclear facilities that are effective against theft and sabotage.

46. To strengthen security arrangements for radioactive sources, further attention was focused on the physical protection and control of radioactive sources throughout their life cycle. A training course devoted to the "Physical Protection of Radioactive Sources" was first held in Australia in cooperation with the Australian Nuclear Science Technology Organisation (ANSTO) and the US National Nuclear Security Administration (NNSA) and in March 2006 in South Africa, and then in April in Argentina (in Spanish).

47. Specialized physical protection courses included seven national workshops on the methodology to develop the design basis threat (DBT) required to define the performance targets for physical protection systems, a course on the technical features of physical protection systems which included hands-on training, and a course to prepare national authorities for conducting inspections of physical protection arrangements. The latter courses were delivered at the Interdepartmental Special Training Centre (ISTC) in Obninsk, Russian Federation, where facilities for practical, in-field training, funded by the NSF, have been established. A new course relates to vital areas in nuclear installations, which are particularly vulnerable to acts of sabotage and therefore require strengthened physical protection. The methodology and general guidance is presented in a specialized training course.

48. Pursuant to the objective stated in Activity Area II of the Nuclear Security Plan, the Agency is helping five Member States, Armenia, Bulgaria, Serbia, Romania and Kazakhstan, to improve the security of their nuclear installations, including nuclear power plants (NPPs), by purchasing physical protection equipment for upgrades. In addition, contracts have been placed for physical protection upgrades at a site containing radioactive sources in Croatia and upgrades at sites with high-activity radioactive sources in Bosnia and Herzegovina and Montenegro are under discussion.

49. In December 2005, the Agency established a partnership programme for human resource development with the Pakistan Nuclear Regulatory Authority (PNRA). Under the partnership, the Agency has organized a series of technical and scientific visits and on-the-job training for officers from the national regulatory authority, including a technical visit to the Interdepartmental Special Training Centre (ISTC), in the Russian Federation as foundation for human resource development in Pakistan. The training programme included physical protection of radioactive sources, the foundations of physical protection of nuclear material and facilities and combating illicit trafficking.

50. A nuclear security training course for lawyers was held in April 2006 to create a pool of legal experts to be available for participation in nuclear security missions and legislative assistance projects. The course covered general nuclear law, the international legal framework for nuclear security and for safeguards and non-proliferation; implementing legislation on nuclear security and safeguards; regulatory activities in radiation safety and security of radioactive sources; the Agency's legislative assistance programme, and the Agency's various nuclear security advisory missions.

51. A regional workshop on nuclear material accountancy and control at the level of nuclear facilities was held for the second time in China in May 2006.

### F.1.2. Detection and response

52. To assist States in establishing effective radiation detection capabilities at border-crossing points and respond to seizures of nuclear and other radioactive material, five national, 12 regional and one international training courses were convened. More than 400 participants, representing 69 States, were trained.

53. The International Seminar on Nuclear Security was organized for the fourth time in 2005, at the Argonne National Laboratory (ANL). The purpose of the seminar is to present an overview of all topics that must be addressed in establishing a comprehensive nuclear security system at the State level.

54. In October 2005, three regional training courses on advanced detection equipment for front-line officers and mobile expert support team (MEST) members were held in Greece, in cooperation with the Greece Atomic Energy Commission.

55. During 2005 and 2006, two topical workshops were developed and implemented. The first new workshop, on 'response' to acts of illicit trafficking, was organized in cooperation with the EU Joint Research Centre in Germany, in June 2006. The workshop will be repeated in November 2006 and planned for periodic recurrence. The workshop includes nuclear forensic topics i.e. the verification of alarms and characterization of nuclear and other radioactive material, methods to categorize the material and the preservation of forensic evidence and the conduct of investigation when nuclear or other radioactive material is detected in trafficking.

56. The second new workshop focused on the discussion and finalization processes of an INSSP and was held in Paraguay. The workshop dealt with the identification of a comprehensive set of tasks and responsibilities for the implementation of the Plan.

57. In cooperation with the US Department of Energy, a training course on radiation detection for Iraqi front line officers and radiation detection staff was held in Jordan in June 2006.

### F.1.3. Training Efficiencies

58. Work is well underway in developing a comprehensive nuclear security training programme which will comprise a series of modules which can be assembled into training courses as needed. This will reduce to a minimum the need to develop customized training packages. Regional training centres, which would take on some of the resource burden currently carried by the Agency, are established in China, Greece, India, the Russian Federation and the USA. Another avenue for increased efficiency in training delivery is e-learning. This offers potential savings together with sustainability benefits. A graduate (masters) course has been introduced at the university at Sevastopol in Ukraine and courses will also be established at other universities in other regions.

## F.2. Improving technical capabilities for nuclear security

59. Effective nuclear security arrangements require technical equipment at nuclear installations and at borders for the detection of radiation in goods and persons. The provision of urgently needed technical upgrades and equipment has been a foundation for effective assistance to States in enhancing the security of nuclear and other radioactive material since the establishment of the Nuclear Security Programme in 2002. To ensure functionality of the detection equipment, **the Nuclear Security Equipment Laboratory (NSEL)**, continued to test detection equipment prior to delivery to States and to arrange for the correction of any problems and for instrument replacement as necessary. The NSEL fulfilled a large role in the coordination, procurement and delivery of radiation detection equipment to States, participated in training courses on combating illicit trafficking and provided technical advice and hands-on training on detection equipment.

60. From mid-2005 to mid-2006, the Agency procured 760 pieces of equipment for 19 States in Africa, Asia, Europe and Latin America. This equipment enhances detection capabilities at borders, and some was dedicated to strengthen State systems of nuclear material accountancy and control. The equipment included: radiation portal monitors, radionuclide identification devices, personal radiation detectors, neutron search detectors, movable radiation monitors and mini multi-channel analysers. The

equipment needed was provided to States as follow-up to assessment missions and the training needed to operate the equipment was arranged in separate events.

61. The Agency helped five States improve the physical protection of nuclear installations and locations having high-activity radioactive sources.

### F.2.1. Research and Development: Coordinated Research Projects

62. In 2006, the Agency concluded its three-year **coordinated research project (CRP) on "*Improvement of technical measures to detect and respond to illicit trafficking of nuclear material and other radioactive material*"**, the first CRP established under the Agency's nuclear security programme. Important results achieved under the project include:

- Development of a sensitive, hand-held neutron detector for the localization of weak neutron sources;
- Improvement of radioisotope identification devices and the investigation of new scintillator materials to improve the performance of such devices;
- Demonstration of the radioisotope identification devices for the characterization of radioactive sources in legal border crossing shipments without opening the shipment container; and
- Completion of technical and functional specifications.

63. In late 2005, a **CRP on "*Applications of nuclear forensics in illicit trafficking of nuclear and other radioactive material*"** was initiated. The objective of this CRP is to enhance responses to the seizure of nuclear and other radioactive material in illicit trafficking as part of ongoing national and international efforts to combat trafficking of this material. In particular, the CRP should result in procedures and improved techniques for categorization and characterization of seized nuclear and other radioactive material; preservation of forensic evidence; sampling and transport for forensic analysis; and nuclear forensic interpretations. The CRP will also improve procedures for providing nuclear forensic support to regulatory and law enforcement authorities.

64. Outputs of the nuclear forensics CRP will include:

- Development of improved techniques and testing instruments;
- Development of common procedures to preserve evidence throughout the entire process of dealing with seized nuclear or other radioactive material and its characterization;
- Development of guidelines and procedures for sampling, packaging, and transportation of nuclear and radioactive material for nuclear forensic analysis and interpretation;
- Review of available instruments, techniques and procedures, development of methods and proposals to improve, establishment of capabilities to characterize nuclear material in seizures; and
- Establishment of a process to provide nuclear forensic support, upon request by States.

## F.3. Emergency response

65. Guidelines and recommendations for response to radiological emergencies, related Agency evaluation missions, capacity building and other assistance, make a clear contribution to enhancing nuclear security by enhancing States capabilities to respond effectively to radiological emergencies caused by malicious acts.

66. Emergency Preparedness and Response Evaluation Missions (EPREV) help States, on request, to identify potential enhancements to their emergency response measures. Such a mission was carried out in Qatar in 2006. In addition, six training courses for first responders were held during the period of the report. A manual for first responders to a radiological emergency was tested during a national exercise in Indonesia in September 2005. Publication of the manual[20] is imminent. The Agency also developed the concept of operations for the Response Assistance Network (RANET)[21]. The RANET is a network of Competent Authorities willing and capable of providing, upon request, specialized assistance to other States to respond to nuclear or radiological emergencies or other incidents.

67. The Agency's ability to assist States in responding to events, whether caused by an accident or a terrorist or criminal act, was enhanced by the establishment of the new Incident and Emergency Centre (IEC). The centre is equipped with enhanced functional arrangements and technological capabilities and provides 24/7 cover.

## F.4. Nuclear security at major public events

68. Following the successful implementation in 2004 of the multilateral Athens Olympic Games security project, the Agency established a project with the German authorities for development and implementation of radiological security measures for the major public events associated with the 2006 **Football World Cup**, held in Germany. The objective of the project was to enhance the capabilities of the responsible authorities providing for scientific, procedural and technical support. In particular, it included information support, drawing on the ITDB reporting, and on facilitating the provision of technical equipment and related training. The Agency also provided advice and assistance in the area of emergency preparedness. Consultations are underway on cooperation regarding nuclear security measures with the organizers of other forthcoming major public events.

# G. Risk Reduction

69. Risk can be reduced not only by enhancing physical protection measures but also by removing or reducing inventories of high-risk materials such as HEU or high activity sources.

70. Risk reduction is being achieved by converting reactors from HEU to LEU under the **Reduced Enrichment for Research and Test Reactors (RERTR) programme**; by de-commissioning shut-down reactors, and by repatriating stocks of fresh and spent HEU fuel to the country where they were originally enriched; e.g. under the **Russian Research Reactor Fuel Return (RRRFR) programmes** and the USA **Foreign Research Reactor Spent Nuclear Fuel (FRRSNF) acceptance programme**. The Agency, supported by US funding, has arranged[22] for the transportation of about 120kgs of fresh HEU fuel from nine States since 2002. Further shipments are underway or planned. The first shipment of spent HEU fuel under the RRRFR took place at the end of 2005 with the return of spent fuel from Uzbekistan to the Russian Federation. These activities make a substantial contribution to enhancing nuclear security by reducing the risks of the theft of HEU fuel from research reactors.

---

[20] 'Manual for First Responders to a Radiological Emergency' EPR-First Responders 2006.

[21] 'IAEA Response Assistance Network' EPR-RANET 2006 published 1 May 2006.

[22] TC project RER/4/028.

71. The Agency has also provided extensive assistance to States for the reduction in the number of high-risk and vulnerable radioactive sources. This year marked the completion of the **Tripartite Initiative**. The project was established in 2002 between the Agency, the Russian Federation and the United States in a cooperative effort to secure high risk radioactive sources in States of the former Soviet Union. Using the results of a series of fact-finding missions conducted in 2003 and 2004, a priority list of sources to be secured in nine States was established and agreed with the State authorities.

72. Under the Tripartite Initiative, the Agency arranged for the dismantlement and transport into safe and secure storage of high activity vulnerable radioactive sources with a total activity of 2120 TBq (57251 Ci) which is a significant amount. In addition, the US Department of Energy team completed security upgrading work on operating sources or provided storage facilities in thirteen States. By securing these sources or transferring them to secure, safe and sustainable storage, the availability of radioactive material for malicious use, and the risk of accidents, was substantially reduced. The Initiative also contributed to a general raising of awareness of the security of radioactive sources in the region.

73. As part of a systematic programme of support for States in recovering, repatriating and/or securely storing sources, the Agency carried out a number of missions for the recovery and conditioning of high-activity and neutron sources. More than 100 sources, including six Category 1 sources, were recovered from States including Côte d´Ivoire, Haiti, Panama, South Africa, Sudan, Tanzania and Uruguay. The sources were collected for repatriation, with 72 of them repatriated to their suppliers. In one case, the shipment of sources to another user was arranged.

74. The Agency also has been instrumental in recovering high activity and neutron sources in Africa and Latin America. The Agency supports the development of a mobile unit which will allow spent high activity radioactive sources (SHARs) to be conditioned prior to shipment to secure storage. The first unit is expected to be completed and ready for operation in Africa by 2007. Discussions are underway with States in other regions concerning joint efforts to recover and secure high-risk radioactive sources.

75. Risk reduction is also achieved by locating and securing orphan sources. The Agency supports the development of **national strategies** and provides advice to States on methodologies for searching for and locating orphan sources. Work on searching and securing lost sources in South East Asia has been carried out within the Regional Radiological Security Partnership established between Australia, USA and the Agency. In 2005–2006, NSF funding supported follow-up work to national strategies missions in two States in Central Asia.

# H. International Cooperation

## H.1. International and regional organizations

76. Pursuant to the objective stated in Activity Area I of the Nuclear Security Plan, the Agency continues to cooperate with international organizations with mandates of relevance for nuclear security, including those in the context of the Counter-Terrorism Implementation Task Force established by the Secretary General of the United Nations. The Agency concluded a Cooperation Arrangement with **Interpol** in early 2006. This agreement provides, inter alia, the framework for developing a common data platform on illicit trafficking incidents and for sharing analysis and evaluation. The Agency continues to cooperate with **EUROPOL** in the field of illicit trafficking

analysis and is seeking synergies with the **Organization for Security and Cooperation in Europe (OSCE)** and the **United Nations Office on Drugs and Crime (UNODC)** in border monitoring, legislative assistance and other issues. Interaction continued with the **Universal Postal Union (UPU)** and **World Customs Organization (WCO)**, in particular in the development of security guidance documents. The Agency continues to provide assistance upon request to the United Nations Committees for Security Council resolutions 1540 and 1373. Information on Agency programmes and activities has been provided at regional meetings and working meetings.

## H.2. Global Partnership

77. As part of their contributions to the G8 Global Partnership, Canada, Germany and the United Kingdom have made contributions to the Nuclear Security Fund. At its Gleneagles Summit in the UK in 2005, the G8 reaffirmed their commitment to building on the considerable progress made to implement cooperative projects to which the G8 and thirteen other States now contribute. The G8 committed themselves to implementing the Code of Conduct and urged all other States to adopt the Code and its Supplementary Guidance.

78. At the July 2006 G8 summit, held in St. Petersburg, Russian Federation, the Presidents of the Russian Federation and the United States announced the **Global Initiative to Combat Nuclear Terrorism**. The initiative will focus on building partnerships for the implementation of the amended CPPNM and the Nuclear Terrorism Convention and to other relevant international instruments. The initiative underlined the Agency's Nuclear Security Plan and the importance of continued work with and support for the Agency's activities for these purposes.

## H.3. European Union Strategy against the Spread of Weapons of Mass Destruction

79. In December 2004, the European Union established its *Strategy against the Spread of Weapons of Mass Destruction*. The strategy includes working with the Agency in support of its nuclear security programme. Beginning in 2005, the Agency and the European Union started a Joint Action within the framework of the Strategy. The cooperation between the Agency and EU entails concerted work to secure nuclear and other radioactive material including that in non-nuclear use, and to enhance detection and response capabilities in States[23] in South-Eastern Europe, Central Asia and the Caucasus. The project's priorities are to strengthen the physical protection of nuclear material and of other radioactive sources in nuclear facilities; to strengthen the security of radioactive sources in non-nuclear applications; and to strengthen States' capabilities for detection of and response to illicit trafficking. The implementation of the projects is coming to completion in 2006.

80. In July 2005, a second Joint Action was concluded extending the scope of the assistance and the geographic regions covered by the project. Nine States in North Africa and the Middle East[24] were added to be eligible to receive support under project areas established under the first cycle of work, with the addition of a project on providing support to strengthen national legislative frameworks for the implementation of safeguards agreements and additional protocols. The implementation period of this Joint Action is from February 2006 to April 2007.

81. In June 2006, the EU Council of Ministers adopted the third Joint Action between the EU and the Agency, extending further the geographic regions to include African States and the scope of

---

[23] The selected recipient States were: Albania, Armenia, Azerbaijan, Bosnia and Herzegovina, Bulgaria, Croatia, Georgia, Kazakhstan, Republic of Moldova, Serbia, and The Former Yugoslav Republic of Macedonia.

[24] Eligible recipient States: Algeria, Egypt, Israel, Jordan, Lebanon, Libya, Morocco, Syria and Tunisia.

activities to include legislative and regulatory assistance, strengthening the security and control of nuclear and other radioactive material, and strengthening State's capabilities for detection of and response to illicit trafficking. The projects will be implemented in 2007–2008.

## H.4. Radiological Security Partnership (RSP)

82. The **Radiological Security Partnership** (RSP) covers risk-reduction activities and focuses on the security of vulnerable, high-risk radioactive sources. The RSP was initiated by the US Department of Energy to address "the potential threats from under-secured high-risk radioactive sources". Under the auspices of the RSP, the Agency has entered into **three Regional Radiological Security Partnerships** with:

- **Australia and the USA** for increasing awareness on the security of sources and human resource development in Southeast Asia. Activities include training, technical advice, recovery of unsecured or disused sources and the security of research reactors;
- **India and the USA** for the provision of training, instrumentation, technical support and awareness building in and between States in the south Asia region. Modalities of regional cooperation have been outlined and activities including education and training have commenced;
- **South Africa and the USA** for recovering and securing disused, high-activity sources. Activities include training and technical development.

# I. Information and Networking

## I.1. Illicit Trafficking Database

83. Pursuant to the objective stated in Activity Area I of the Nuclear Security Plan, the Agency maintains the **Illicit Trafficking Database (ITDB)**, which collects and analyses information on incidents of illicit trafficking and other unauthorized activities involving nuclear and other radioactive material. Incidents reported to the ITDB provide indicators of threats through the nature of the material or the intentions the incident revealed; indicators of vulnerabilities in control and other security measures; and indicators of vulnerabilities at borders. In addition, the reporting can provide information on methods and strategies for theft, transport and evasion of detection and also what market is perceived to exist. As of 1 July 2006, ITDB membership consisted of 91 participating States. Algeria, Brunei Darussalam, the Central African Republic, India, Luxembourg, Mali, Niger and Pakistan joined the ITDB programme during the period covered by this report. Efforts to expand the membership of the ITDB will continue including outreach and promotional activities.

84. A meeting of ITDB national Points of Contact (POC) was convened in Vienna in May 2006 to review the operation of the data base. The POCs supported the broad scope of the ITDB information and adopted a revised definition of the scope; adopted revised terms of reference and incident notification form (INF) with its corresponding instructions; agreed on the transition to optional electronic dissemination of ITDB information to POCs; and welcomed the development of the secure web application of the ITDB which should ensure access of the POC to selected ITDB information in a timely fashion.

85. In response to an interest in developing knowledge and information sharing on illicit trafficking, analysts of different national, regional and international organizations engaged in collection and analysis met in Vienna in May 2005. The meeting was held in cooperation with Europol as a follow-up activity to the First Europol Seminar on Trafficking of Nuclear and Radiological Material, held in the Hague in October 2004. Participants discussed methods and methodologies of collection, collation, and analysis of information; and exchanged information on various cases of concern and general developments. To enhance cooperation in information and knowledge sharing at the level of experts, the Agency launched the **Illicit Trafficking Analysis Working Group (ITAWG)** information network and knowledge sharing online portal in December 2005. The value of the ITAWG will be reviewed and assessed after one year of operation.

86. The data in the Illicit Trafficking Database has the potential to offer insights into potential threats and risks, into vulnerabilities and weaknesses in protection and control systems, and into detection systems and technologies. Combined with other security-related information, this data will contribute to the targeting and prioritizing of activities to ensure the most effective use of available resources. The Secretariat will continue its efforts to broaden the scope of the information in the data base and to increase the depth of knowledge on incidents of high interest.

## I.2. International conferences

87. In February–March 2006, the **International Conference on Effective Nuclear Regulatory Systems**, held in Moscow, gave senior nuclear regulators an opportunity to discuss ways of improving the effectiveness of nuclear safety, radiation safety and nuclear safety and security regulation. The Conference noted the need for authoritative guidance on nuclear security issues in keeping with the level of guidance available on nuclear safety. The Conference called for the recognition of synergies between measures adopted for nuclear safety, security and non-proliferation, as addressing concerns in any one of these areas can directly complement the status of the others.

88. The Moscow Conference called for a series of actions by the Agency, including consulting with Member States on the need to expand the Illicit Trafficking Database; establishing the Nuclear Security Series of publications as a resource for regulators; continuing to develop programmes of education and training; and increasing the Agency's cooperation with other international organizations dealing with problems relating to terrorism.

89. In April 2006, the **Pan American Meeting on Strengthening Implementation of International Instruments in the Americas for Enhanced Nuclear and Radiological Security,** organized by the Government of Ecuador in cooperation with the Agency, was held in Quito. The objective of the meeting was to increase awareness of the need to strengthen nuclear and radiological security through the implementation of existing international legal instruments and through enhanced cooperation among the States of the Americas. The Meeting addressed the importance of international coordination and cooperation to strengthen the legal, technical and administrative infrastructures that are necessary to effective approaches against the nuclear security threats posed by non-State actors and considered how resources could be most effectively engaged to implement these approaches.

90. Outcomes of the Pan-American Meeting included consensus that: States should continue and expand support for all international instruments relating to nuclear security, which is of essential importance in strengthening the international nuclear security regime; high consideration should be accorded to nuclear security priorities in view of the ongoing efforts to promote economic and social development in the Americas through the expanded use of peaceful nuclear applications; and the Agency should continue to support States requiring assistance in developing and implementing the means for meeting national responsibilities under the legal instruments that are relevant for nuclear security.

# J. Programme Implementation

## J.1. Agency's Medium Term Strategy

91. The IAEA **Medium Term Strategy 2006–2011** identified the achievement of a comprehensive and effective international framework for strengthening nuclear security as a major goal. To this end, it established the strengthening of international security-related instruments and undertakings, and establishing global acceptance of an agreed international framework for nuclear security and its implementation as key objectives. These covered the development of an effective international framework to ensure sustainability of nuclear security systems; advising on and assisting in the establishment of national security infrastructures; developing comprehensive recommendations and guidelines for the prevention, detection and response to acts of nuclear terrorism or other malicious acts; developing effective techniques, methodologies and services to assist in combating illicit trafficking including the necessary information systems; cooperating with other international and non-governmental organizations; and increasing outreach to both Member and non-Member States and to the public at large. These goals and objectives are consistent with the objectives and detailed activities described in the Agency's Nuclear Security Plan 2006–2009 and with the programmatic activities shown in the Agency's Programme and Budget.

## J.2. Management of cross-cutting activities

92. Nuclear security and protecting against nuclear terrorism engages competencies from various areas of the Agency's work. It combines technical expertise in the core areas of nuclear security with expertise in safeguards, nuclear energy, nuclear safety, nuclear science and applications, legal affairs and external relations areas, and the implementation experience of technical cooperation. The Office of Nuclear Security has been assigned responsibility for leading the planning, monitoring and implementation, and evaluating of, and reporting on, cross-cutting activities and of the extra budgetary funds, provided by donors through the Nuclear Security Fund (NSF), to finance them. Meeting these requirements has demanded the development of a range of administrative and financial mechanisms to allow coordinated planning and implementation (see paragraphs 93-94), and to monitor progress and reporting. In particular, States and other donors expect periodic reports on the expenditure of their extra budgetary contributions with an accompanying statement of outputs and achievements. The Secretariat continues to improve its processes to ensure that activities are planned and prioritized in accordance with programme and donor priorities and that resources are effectively and efficiently used.

## J.3. Security synergies

93. Security and safety measures share a common aim of protecting human life and health, and the environment. While security measures are directed at preventing, detecting or responding to malicious acts, safety measures are designed to prevent accidents or to establish a balance between exposure to ionizing radiation and operational requirements. In developing safety standards and security guidance, and related implementation tools, the Agency has sought to identify and maximize the appropriate synergies with the aim of achieving consistency and efficiency. For example, joint missions are convened to evaluate and assess the effectiveness of national laws and regulations for control of radioactive sources. As far as administration of sources is concerned, the processes are combined and the results shared. Laws and regulations applying to other aspects of nuclear security, e.g. in the criminal code or related to combating illicit trafficking, do, however, still need separate examination.

Other synergies can be found in engineering safety design measures which help to reduce the vulnerability of vital areas in nuclear facilities, thereby contributing to protection against sabotage.

94. Similarly, security and safeguards objectives are jointly attained by measures to enhance the control of and accounting for nuclear material. Training in implementing State systems of accounting for and control of nuclear material has been set in both a safeguards and security framework. The safeguards system in general, with its focus on deterring and detecting the diversion of nuclear material makes a key contribution to the overall nuclear security architecture and, in turn, security requirements such as early detection of theft, detection of illicit trafficking, nuclear forensics and physical protection of nuclear material, make a substantial contribution to non-proliferation objectives.

95. For its legislative assistance programme, the Agency has pursued a comprehensive approach, referred to as the "3S" concept, which recognizes the interface between nuclear security, nuclear safety and safeguards as well as nuclear liability.

## J.4. Prioritization

96. The Agency assigns increased attention to prioritization in the implementation of the Agency's Nuclear Security Plan. Priorities could be applied in a number of ways. They could be geographic: making choices in activities between one region, or State, and another. They could be functional: making choices between developing requirements and recommendations, and performing missions or training. They could be technical, choosing prevention over detection activities or 'soft' assistance such as training over 'hard' assistance such as equipment supply. Priorities could also relate to out-sourcing versus in-sourcing or could be time-related, implementing some activities promptly and postponing others to a later date.

97. Given the integrated nature of an effective nuclear security regime, priorities must be selected with considerable circumspection to avoid creating or tolerating a 'weak link'. Furthermore, the scope for establishing and assigning priorities is determined by the following. First; the Agency's Programme and Budget 2006–2007 "includes only activities of high priority". Within these, nuclear security projects are assigned a ranking of 1, the highest. Second, the Agency's nuclear security activities are almost exclusively funded by extra budgetary contributions. The Agency's scope for setting priorities is, therefore, conditioned by the flexibility it has in utilizing these extra budgetary funds. Third, many nuclear security activities are carried out in response to Member States' requests; e.g. missions and follow-up activities. Priorities are determined, therefore, by States' expressed requirements. Finally, the Agency seeks to ensure that, in implementing its programme, the needs of all geographic regions are addressed.

98. The Agency has introduced various mechanisms which will help to establish priorities. INSSPs will establish internal national priorities based on needs and providing an agreed schedule for implementation of measures to address them. Set in a larger framework, these plans will provide input for medium term (one year ahead) mission and training plans. Second, enhancing the analytical utilization of data from the Illicit Trafficking Database and elsewhere will provide insights into potential threats and vulnerabilities in protection and detection systems. Third, donor States are being actively encouraged to give, where practical, the maximum flexibility in the use of Nuclear Security Fund (NSF) resources.

99. Prioritization is likely to become an increasingly pressing issue. Missions and capacity building activities are expanding quickly, there is a heavy programme of developing new security guidelines for Nuclear Security Series and the requirements for education and training opportunities. Efficiency gain offers some scope for helping to match resources to requirements but it will not be possible for available resources to meet all these requirements simultaneously. While the Agency is continuing to

seek ways to prioritize the activities within the agreed Plan, extended planning periods and scheduling of activities is likely.

## J.5. Funding

100. Implementation of the Nuclear Security Plan 2006-2009 is almost wholly dependent on the donation of extra budgetary funds by Member States and others[25] to the Nuclear Security Fund (NSF) and on in-kind contributions. Without these, the programme would, in most aspects, cease to exist. Financial contributions are usually made on an annual basis and without any firm commitment to longer term funding. Planning for implementation of the Nuclear Security Plan has to be carried out in the context of this unpredictable and short term resource setting.

101. In calendar year 2005, the financial contributions to the NSF totalled $10,427,392.71 (excluding interest accrued). Fewer Member States provided extra budgetary funds and the heavy reliance of the NSF on a small number of major donors; these provided more than 90% of the NSF funding, increased. Consequently, the future of the nuclear security programme is disproportionately reliant on donations from a small pool of donors.

102. In the period covered by this report, financial contributions to the NSF were received from the Czech Republic, Finland, Germany, Ireland, Italy, the Netherlands, New Zealand, Poland, Romania, Slovenia, Sweden, the United Kingdom, the United States of America and the European Union. Funding was also provided by the Nuclear Threat Initiative. In addition, Member States have provided in-kind contributions such as cost-free experts, use of facilities and hosting regional training activities. Such in-kind contributions make an important and substantial contribution to the Agency's nuclear security programme.

103. The majority of contributions to the NSF have specified conditions for use of the funds. Some are more specific than others. The Agency's external auditor has indicated (2004 and 2005) that the number and extent of 'restrictions' limiting flexibility in the use of the funds was a cause for concern. As noted above (paragraph 98 refers), donor States are being actively encouraged to give, where practical, the maximum flexibility in the use of their donations. Some progress has been made in meeting the concerns of the auditor. Where appropriate, the Secretariat discusses requirements with States providing funding to the NSF before a donation to the NSF is finalized. This prevents uneven financing and helps to focus funds where they are needed.

104. The IAEA Programme and Budget 2006–2007 consolidated most of the Agency's nuclear security related activities into one programme: Nuclear Security (Programme M). Excepting a small Regular Budget component, most funding comes from the NSF. The safety programmes (X, J, K, and L) and the Safeguards Programme (N) include activities that whilst established to support safeguards and safety objectives, also support the objectives of the nuclear security programme. These programmes are largely funded by the IAEA Regular Budget and supported by other extra budgetary contributions but funds from the NSF are used to enhance or accelerate implementation of these activities for nuclear security purposes.

105. The programme delivery mechanisms established for the Technical Cooperation Fund are also used, when appropriate, for the implementation of nuclear security activities funded by the NSF. This ensures an efficient and consistent use of resources in a coherent programmatic context. Disbursement of NSF funds using the Technical Cooperation mechanism has risen from $411,508 in 2002/2003 to $712,915 per annum in 2005. As of 31 July 2006, NSF expenditures through TC amounted to $2,633,096.

---

[25] See Annex 2 of this report for a list of donors and pledges.

106. NSF expenditures[26] and disbursements are shown in Table 1. It is clear that disbursements for 2006 will substantially exceed those for the preceding years which, in turn, have been steadily increasing.

**Table 1: Nuclear Security Fund: Expenditures and Disbursements**

| | | |
|---|---|---|
| **2002/2003** | **Disbursements** | **$5,746,043** |
| **2004** | **Disbursements** | **$7,662,548** |
| **2005** | **Disbursements** | **$8,828,591** |

| | | |
|---|---|---|
| **2006 (as at 31 July)** | **Expenditures** | **$13,128,347** |
| | **Pre-commitments[27]** | **$2,277,600** |
| | **Funds available** | **$9,715,181** |

107. The external auditor has drawn attention to an apparently high carryover of NSF funds from one budget year to the next: on 31 December 2005, the accounts showed $20,755,199 in the NSF. The auditor's observation requires, however, some qualification. The NSF received $5,278,856 in December 2005, just before the books were closed. Furthermore, $3,025,508 of the carry-over was reserved for staff and procurement contracts and $4,200,000 was blocked awaiting clarification from the donor on the purpose for which the funds could be used. NSF funds available on 1 January 2006 were, therefore, substantially lower than the figures suggest. The Secretariat believes that the level of carry-over is consistent with the planning basis required for one implementation year of the Nuclear Security Plan.

## J.6. Programme Performance Management

108. To ensure that funds are directed in accordance with the requirements of the donor States and to generate a credible narrative as well as accurate financial reporting, the implementation of a programme performance support system has been required with capabilities beyond those provided by the Agency's internal programme management and reporting systems.

109. The **Nuclear Security Electronic Programme Support System (EPSS)** is a Web-based system which allows the Secretariat to plan and monitor the implementation of the large number of nuclear security projects. It is capable of generating the financial and performance data required to provide reassurance to donors that funds are spent appropriately and effectively. EPSS is now the main system for the handling of information and knowledge on the nuclear security related activities of the Agency.

110. The key functions of EPSS are:

- To connect - with a high degree of transparency - the elements that make up Agency programmes: people, funds, work, outcomes and documents;

---

[26] Expenditures are disbursements plus unliquidated obligations.

[27] Pre-commitments are funds allocated to a task but not yet obligated.

- To produce narrative statements of results for reporting to NSF donor States on the precise use of their funds. Several donor States have already accepted the system outputs as a satisfactory basis for financial reporting;
- To provide a platform for managers to track and evaluate the implementation of programmes; and
- To provide quick access to documents and data in extended or in summary form.

111. Accurate reporting to donors on the use of their donations to the NSF has been of paramount importance since the inception of the Nuclear Security Programme. During the past year, the Secretariat undertook significant upgrades to internal procedures and technical tools used in producing donor Reports. These upgrades resulted in important progress in the reporting to donor States on NSF receipts and expenditures and enabled a transition from sporadic reporting to standardized and mostly automated reporting. Full integration is provided with the Agency's Financial Information Management System.

## J.7. Advisory Group on Nuclear Security

112. The programme implementation continued to benefit from advice provided to the Director General by the **Advisory Group on Nuclear Security (AdSec)**. AdSec has met twice a year since 2002 and provides advice on a wide range of nuclear security matters.

113. During the period covered by this report, AdSec provided recommendations and suggestions related to the Nuclear Security Plan for 2006–2009, reviewed the Secretariat's proposed *Process for Developing, Reviewing and Publishing Nuclear Security Documents* and provided a number of recommendations on the Nuclear Security Series. AdSec has also provided comment on the scope and structure of documents being developed for publication in this new series.

# K. Trends

114. A new international security regime is emerging based on obligations contained in the Amendment to the CPPNM, the Nuclear Terrorism Convention, the relevant Security Council resolutions and the non-binding Code of Conduct and its Supplementary Guidance. The Agency faces a considerable challenge in structuring the international response to the new instruments and in supporting States' implementation efforts. The new and revised international instruments provide a strong platform on which to develop internationally agreed recommendations and guidelines to be disseminated through the IAEA's Nuclear Security Series.

115. The threat of nuclear terrorism remains undiminished; there is no reason to believe that the interest of terrorist or criminal groups in the use of nuclear and other radioactive material has lessened. The consequences of a malicious act involving a nuclear explosive device would be catastrophic. The standards of performance of actions undertaken by the international community and by individual States are, therefore, set very high. Meeting them continues to be a high priority.

116. The numbers of radioactive sources and their vulnerability combine to increase the likelihood of a malicious acts occurring. The full extent of the consequences of such an act is unpredictable but could be far reaching. High priority will be given to enhancing control and improving physical protection whilst maintaining a balance with the beneficial role of sources in society.

117. The possibility of an attack on a facility or transport with the intention of causing a radiological dispersal event remains. Physical protection and design measures are addressing this possibility but more needs to be done. Fuel cycle facilities and transports require particular attention.

118. Improved coordination with donor States will reduce the potential for overlaps and provide opportunities for work-sharing. The Tripartite Initiative, the Greek Olympics security project and, latterly, border security enhancements in Ukraine, are models of how multilateral activities can be successfully coordinated. Synergies are also being sought with other international organizations. These also provide opportunities for work-sharing efficiencies resulting from the recognition of competences and mutually compatible objectives.

# Annex 1

# Nuclear Security Series Documents in Preparation

1. ***Guidance for the Development and Maintenance of a Design Basis Threat*** is in the final stages of preparation. This document is intended to provide clear guidance to States on how a design basis threat (DBT) should be developed and on how the DBT can be maintained in order to provide a framework for effective physical protection establishment and maintenance.

2. ***General Guidance on the Physical Protection of Nuclear Material and Nuclear Facilities against Sabotage*** will guide Member States in implementing the recommendations on preventing sabotage contained in "The Physical Protection of Nuclear Material and Nuclear Facilities" (INFCIRC/225/Rev.4 (Corr.)).

3. ***Guidance for Identification of Vital Areas at Nuclear Facilities for Physical Protection Against Sabotage*** will provide a methodology and general guidance for identifying vital areas at nuclear facilities and will provide a process for selecting the vital areas, protection of which will make the most effective contribution to meeting the physical protection objectives for a specific facility. Vital area identification can provide valuable insights into the design of facilities and can highlight changes in existing facilities and design features in new facilities which will reduce vulnerability to sabotage.

4. ***Security of Radioactive Sources*** provides guidance to regulatory bodies, manufacturers, suppliers and users of sources on security aspects in keeping with the Code of Conduct and with the complementing guidance already being developed on the safety of sources. The document develops the matter of threat assessment and takes fully into account the consequences of RDD scenarios that could be reflected in security groups.

5. ***Nuclear Security Culture*** defines and provides in some detail the basic concepts and elements of nuclear security culture identified in GOV/2004/41 and the amended CPPNM. It is intended for regulatory bodies and other individuals, organizations and institutions involved with activities that utilize nuclear material or radioactive substances or would be called upon to respond to an incident involving nuclear material and radioactive substances or their associated facilities and transport. Nuclear security culture is a concept that in practice must involve all organizations and individuals, including the public, as appropriate.

6. ***Guidelines for Security during Transport of Nuclear and other Radioactive Material***, will present internationally accepted guidelines and recommendations for security of radioactive material, including nuclear material, during transport. It will include consideration of protection against sabotage, theft and diversion for the purpose of malicious acts. A graded approach that will include a harmonized approach in the categorization of radioactive material for transport is to be adopted, taking account of the attractiveness of the material and the potential radiological consequences of sabotage or unauthorized removal of material during transport.

7. The ***Handbook on Combating Illicit Trafficking in Nuclear and other Radioactive Material*** focuses on unauthorized acts involving nuclear and other radioactive material. It was

developed as an information and training resource for law enforcement personnel who may be called upon to deal with detection of and response to the illicit trafficking incidents, but likewise will be of use for legislators, government officials, technical experts, emergency responders, lawyers, diplomats, users of nuclear technology, media and the general public. While recognizing that a certain level of technical understanding is essential for dealing with radioactive material, the drafters of the Handbook sought to keep technical information to a minimum and to present it in a simplified format for ease of use. This document is expected to be published in early 2007.

8. ***Guidance on the Security of Computer Systems at Nuclear Facilities*** will offer guidance, considerations and recommendations on the threats and vulnerabilities associated with the growing complexity and use of computer systems at nuclear facilities.

9. ***Security of Radioactive Waste*** will provide guidance on the security of radioactive waste and will interface with the revised guidance on the security of radioactive sources, with documents related to the physical protection of nuclear material and nuclear facilities, and with Agency standards for waste safety. Its audience will be regulatory bodies and operators that generate and manage radioactive waste (i.e. waste treatment, storage and disposal).

10. ***Guidance for Physical Protection of Research Reactors and Associated Facilities*** will offer guidance on the issues affecting the physical protection of nuclear research reactors and associated facilities against sabotage and theft of nuclear and other radioactive material, and recommendations on graded levels of protection. The document recognizes that, associated with research reactors, there may be isotope production facilities, research laboratories and storage of fresh and spent fuel. These variations of reactor types and facilities call for different security measures. The document outlines the protection issues unique to research reactors and their associated facilities and provide clear guidance on how these can be addressed.

11. ***Guidelines on Preventive and Protective Measures against Insiders*** addresses the unique and serious threats to nuclear security presented by 'inside actors' who may take advantage of access rights and their facility knowledge for malicious purposes, bypassing dedicated physical protection elements or other provisions such as safety, material control and accountancy and operating measures and procedures. These guidelines should apply to any type of existing nuclear facility, notably nuclear power reactors, research reactors, and all other operating nuclear facilities. The guidelines will also apply to nuclear and other radioactive material transport and can also be applied to the physical protection of other dangerous or valuable goods, such as radioactive sources.

12. ***Nuclear Security at Major Public Events*** defines and provides the basic concepts and elements of nuclear security for major public events. The document is based on experience acquired by the Greece Atomic Energy Agency and the Agency in developing and implementing an effective nuclear security system at the 2004 Summer Olympic Games. It will provide guidance for planning, implementing and improving nuclear security including recommendations for comprehensive and integrated measures for prevention, detection and response by law enforcement authorities and other relevant organizations. This document is expected to be published in early 2007.

13. ***Self-Assessment Guidelines on the Engineering Safety Aspects of the Protection of Nuclear Power Plants against Sabotage including Stand-off Attacks*** guides States on how to perform self-assessment of nuclear facilities against sabotage by analysing facility design, safety systems and vital areas against specified threat scenarios. This document is presently in the publishing process.

14. ***Identification of Radioactive Sources*** will aid non-specialist individuals and organizations in initial identification of radioactive sources, devices and packages that they may come into contact with by accident or in the normal course of their work. This document also is presently in the publishing process.

15. ***Guidelines for Detection and Response to Radioactive Materials in Seaports*** will establish detection and response capabilities for radioactive materials in the seaport environment. Ultimately, it will be published in cooperation with World Customs Organization (WCO), International Maritime Organization (IMO), Interpol and Europol.

# Annex 2

# Nuclear Security Fund

| PLEDGES (2002 - July 2006) | |
|---|---|
| Donor | Amount Pledged |
| Australia | 107,054 |
| Austria | 53,821 |
| Bulgaria | 15,000 |
| Canada | 3,211,729 |
| China | 200,000 |
| Czech Republic | 147,392 |
| European Commission | 8,999,669 |
| Finland | 24,335 |
| France | 667,368 |
| Germany | 1,742,947 |
| Greece | 29,732 |
| Hungary | 70,228 |
| Iran | 30,000 |
| Ireland | 227,136 |
| Israel | 30,000 |
| Italy | 216,500 |
| Japan | 658,000 |
| Republic of Korea | 150,000 |
| Netherlands | 2,183,619 |
| New Zealand | 52,820 |
| Norway | 110,000 |
| Poland | 10,000 |
| Romania | 126,544 |
| Slovenia | 36,675 |
| Spain | 79,572 |
| Sweden | 90,906 |
| Ukraine | 10,000 |
| United Kingdom | 3,082,001 |
| United States of America | 31,651,209 |
| Nuclear Threat Initiative | 1,200,000 |
| **TOTAL PLEDGED** | **$55,214,257** |
| **TOTAL RECEIVED** | **$46,780,243** |