Nuclear Security: Global Directions for the Future

Proceedings of an international conference
London, 16–18 March 2005

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NUCLEAR SECURITY: GLOBAL DIRECTIONS FOR THE FUTURE

The Agency's Statute was approved on 23 October 1956 by the Conference on the Statute of the IAEA held at United Nations Headquarters, New York; it entered into force on 29 July 1957. The Headquarters of the Agency are situated in Vienna. Its principal objective is "to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world''.

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FOREWORD

International terrorism is more far reaching, multifaceted, ruthlessly planned and well financed than ever before. Sub-State actors have shown that they are prepared to attack any target, sacrifice lives (including their own) and use any means to obtain their goals. Criminals have attempted to obtain nuclear and radioactive material. It must be assumed that sub-State actors or criminals may try to acquire weapons of mass destruction, improvise a nuclear explosive device or radiological dispersal device, or attempt to sabotage nuclear facilities, locations or transports. The international community is challenged to make every effort to prevent nuclear or other radioactive material from falling into the wrong hands. Based on a design basis threat, nuclear facilities and other places where radioactive material may be located, as well as transport vehicles, must be protected against sabotage. The potential consequences of any malicious use of nuclear or other radioactive material could be catastrophic and could jeopardize the continued peaceful uses of nuclear technology and applications.

The International Conference on Nuclear Security: Global Directions for the Future was convened by the IAEA in cooperation with the European Union, the Organization for Security and Co-operation in Europe, the International Criminal Police Organization, the European Police Office and the World Customs Organization and was hosted by the Government of the United Kingdom. The conference considered the threat of malicious acts involving nuclear and other radioactive material; the experiences, achievements and shortcomings of national and international efforts to strengthen the prevention of, detection of and response to malicious acts involving these materials; and the ways and means to achieve future improvements. There were 288 participants at the conference from 68 countries and 12 organizations.

This was the first conference of its kind. In the past, conferences have been convened on related subjects:

— In May 2001 the IAEA held the International Conference on Security of Material: Measures to Prevent, Intercept and Respond to Illicit Uses of Nuclear Material and Radioactive Sources, which created an awareness of the consequences that might result from illegal activities involving nuclear and other radioactive material.
— In March 2003 the IAEA and its cosponsors held the International Conference on the Security of Radioactive Sources, which resulted in a number of findings regarding the promotion of greater international cooperation in addressing the security concerns raised by insufficiently controlled radioactive sources.

— The International Conference on National Infrastructures for Radiation Safety, held in Rabat in September 2003, which provided a forum for information exchange on current issues related to the requirements for adequate national radiation safety infrastructures and their evolution towards sustainable and effective systems.

The principal aim of this conference was to share information on how to most successfully combat sub-State and criminal threats now and in the future and to foster a better understanding and awareness of the global changes since 11 September 2001. It considered the nature of future threats involving the malicious use of nuclear or other radioactive material, including ways in which assistance and support to countries without the necessary resources can be more effectively provided and sustained. It examined what has been achieved and how effective the existing measures have been, and considered what should be continued and how the international response might be altered to provide a more comprehensive and coherent approach. The conference sought new ideas to facilitate better and more systematic planning.

These proceedings contain the opening and keynote addresses and the invited papers presented during the various topical and panel sessions. The conference generated an extensive exchange of information on key issues related to a number of aspects of nuclear security. The summaries of these discussions as well as the findings, as presented by the President of the Conference, are also included.

The IAEA gratefully acknowledges the support and generous hospitality extended to the conference participants by the Government of the United Kingdom.

EDITORIAL NOTE

SUMMARY

The potential consequences of any malicious use of nuclear or other radioactive material could be catastrophic and could jeopardize the continued peaceful uses of nuclear technology and applications. Criminals or terrorists could acquire and use radioactive material for malicious purposes in a number of ways: acquire nuclear explosive devices; use nuclear material to build an improvised nuclear explosive device or to construct a radiological dispersal device; or disperse radioactivity through sabotage of installations. In addition, the world is constantly reminded that international terrorism is more far reaching, multifaceted, ruthlessly planned and well financed than ever before. Sub-State actors have shown that they are prepared to attack any target, sacrifice lives (including their own) and use any means to obtain their goals, and have attempted to obtain radioactive material. Therefore, the international community is challenged to make every effort to prevent nuclear or other radioactive material from falling into the wrong hands.

The terrorist attacks on the World Trade Center in New York and the Pentagon, as well as other serious events both before and after, raised concern within the international community over whether enough was being done to protect nuclear and other radioactive material from being used in malicious acts. Even before 11 September 2001 there was an awareness that sub-State actors could steal nuclear material for subsequent use in nuclear explosive devices. This gave rise to an international effort to consider whether the Convention on the Physical Protection of Nuclear Material (CPPNM) should be strengthened, and actions have been taken to amend the convention. After 11 September measures were also taken to significantly strengthen the physical protection of nuclear installations, since it could no longer be assumed that high activity nuclear material and radioactive sources were self-protected. The Code of Conduct on the Safety and Security of Radioactive Sources was revised to include, inter alia, strengthened security requirements. The implementation of the revised Code of Conduct and the implementation of a strengthened international physical protection regime have become top priorities for the international community.

Thus, in an endeavour to assess the adequacy of efforts that have been made to combat nuclear terrorism and to identify a path forward, the International Conference on Nuclear Security: Global Directions for the Future took place in London from 16 to 18 March 2005. The conference was convened by the IAEA in cooperation with the European Union, the Organization for Security and Co-operation in Europe, the International Criminal Police Organization, the European Police Office and the World Customs Organization and was hosted by the Government of the United

Kingdom. There were 288 participants at the conference from 68 countries and 12 organizations.

The conference provided a forum for the international community to discuss the nature of the threat of malicious acts involving nuclear and other radioactive material and associated facilities. A number of panel sessions and discussions provided an opportunity for senior officials to share experiences and review achievements and shortcomings relevant to the international efforts to strengthen the prevention and detection of malicious acts involving nuclear and other radioactive material and to identify future actions for enhancing the global nuclear security regime.

The conference was in full agreement that nuclear terrorism is one of the greatest threats to society and that the threat remains essentially the same in nature as it was three years ago. However, there was also recognition that the international community and individual States have made important progress in their level of preparedness in preventing, detecting and responding to the threat. A consistent theme during the conference was that a much greater effort is needed and that the IAEA has a significant role to play in the struggle.

In facing these challenges, the conference recognized that the international community must continue to work to identify specific threats; share and make the best use of the information available about illicit nuclear trafficking and other nuclear security related events; strengthen prevention against such acts; raise the level of awareness of the need for nuclear security among senior officials; and maintain the confidentiality of the sensitive information involved. The relationships and synergies between security, safety and safeguards should be recognized and taken into account in the development of nuclear security programmes.

The conference noted that the increased number of legal instruments that underpin the international nuclear security framework has provided the international community with additional tools to assist in efforts to prevent malicious acts involving radioactive material. In particular, it was emphasized that the strengthening of the CPPNM represents a significant step forward for nuclear security. It will provide a strong basis to guide the augmenting and updating of the IAEA's existing programmes of assistance to States in the area of nuclear security and in the development of new initiatives. It was recognized that continued and enhanced efforts are needed to provide for the full and effective implementation of the CPPNM and Code of Conduct, facilitated by international consensus nuclear security guidelines and recommendations.

The conference noted that while the responsibility for nuclear security rests uniquely with each State, it is of global concern, and international support and cooperation can assist States in their efforts. Through programmes implemented by individual States and by the IAEA, awareness of the measures needed to address nuclear security for all activities involving nuclear or radioactive material has grown significantly over the past three years. In many States steps have been taken towards improving regulatory infrastructures: physical protection and accountability within many States have been improved. Two papers indicated that there is an expanding interest in installing radiation detection at border crossings, as well as preparing measures to respond to criminal acts or terrorism involving radioactive material. In both papers and follow on discussions, the view was expressed that these efforts must continue and be strengthened globally.

Finally, there was a consistent recognition that there must be coordination and cooperation at the global, regional and bilateral levels. Only limited resources are available, and therefore coordination is needed to optimize the use of resources. The harmonious theme of the conference was that nuclear security is a matter of global concern. To be effective, the work should include all countries in all regions, and promote sharing of experience and lessons learned. The broader challenges for the international community will require new approaches and alliances between nuclear authorities, law enforcement and intelligence authorities, and the scientific community.

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OPENING SESSION

OPENING ADDRESS

NUCLEAR TERRORISM: IDENTIFYING AND COMBATING THE RISKS

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Security strategies were for many centuries based on boundaries: the strategic placement of cities and borders to take advantage of natural barriers; defences that relied on walls, trenches and armadas; and the use of ethnic, religious or other groupings to distinguish friend from foe. In the 20th century the advent of aeroplanes, submarines and ballistic missiles began to undermine this approach to security, by enabling the remote delivery of destruction on a scale previously not envisioned.

However, the change that has altered the international security landscape the most drastically is, in fact, globalization. The global community has become interdependent, with the constant movement of people, ideas and goods. Many aspects of modern life — communication, the global marketplace and, most recently, the rise in international terrorism — clearly indicate that our understanding of and approaches to national and international security must be adjusted, in keeping with new realities.

1. NUCLEAR SECURITY AND PROTECTION AGAINST NUCLEAR TERRORISM

The security of nuclear and other radioactive material and associated technologies has taken on heightened significance in recent years. The IAEA has been active in the field of nuclear security for many years, but, as you are all aware, the events of September 2001 propelled the rapid and dramatic re-evaluation of the risks of terrorism in all its forms — whether related to the security of urban centres, industrial complexes, harbours, oil refineries, air and rail travel, or activities involving nuclear and radiological material. Terrorist attacks since that time, in Indonesia, the Russian Federation, Spain and elsewhere, have continued to keep these concerns in the forefront of our collective consciousness. For those of us in the nuclear field, it has become obvious that our work to strengthen nuclear security is both vital and urgent — and that we must not wait for a 'watershed' nuclear security event to provide the needed security upgrades.

International cooperation has become the hallmark of these security efforts. While nuclear security is and should remain a national responsibility, some countries still lack the programmes and the resources to respond properly to the threat of nuclear and radiological terrorism. For these countries, international cooperation is essential to help them strengthen their national capacities. International cooperation is also essential to our efforts to build regional and global networks for combating transnational threats.

2. UNDERSTANDING THE RISKS

The IAEA has categorized four potential nuclear security risks: the theft of a nuclear weapon; the acquisition of nuclear material for the construction of nuclear explosive devices; the malicious use of radioactive sources, including in so called dirty bombs; and the radiological hazards caused by an attack on, or sabotage of, a facility or a transport vehicle.

These risks are real and current, but they are not all the same. While the probability of a nuclear explosive device being acquired and used by terrorists is relatively small, it cannot be dismissed, and the consequences would be devastating. On the other hand, a dirty bomb would likely have far less impact in terms of human life, but the relative accessibility of radiological sources makes it more likely that such an event could occur.

Some experts share the view of the Director General of the United Kingdom Security Service, who said in August 2003 that "It will only be a matter of time before a crude version of a [chemical, biological, radiological or nuclear] attack is launched at a major western city." To date, the IAEA's own database on illicit trafficking has recorded, since 1993, over 650 confirmed incidents of trafficking in nuclear or other radioactive material. Last year alone, nearly 100 such incidents occurred, eleven of which involved nuclear material. While the majority of trafficking incidents do not involve nuclear material, and while most of the radioactive material involved is of limited radiological concern, the number of incidents shows that the measures to control and secure nuclear and other radioactive material need to be improved.

However, effective and credible approaches to nuclear security are essential not only for detecting and responding to illicit trafficking but also for the protection of nuclear power plants, research reactors, accelerators and the array of nuclear and other radioactive material that supports these and other nuclear applications. To optimize the effectiveness of these efforts, it is important to prioritize — to focus on those facilities and activities where the risk is greatest — and to maintain a balance between security needs and the many benefits of the peaceful applications of nuclear technology. For example, the recent increase in the denial of shipments of radioactive material by commercial carriers, while driven by perceived security concerns, can be a matter of equally significant humanitarian concern — particularly when such shipments involve radionuclides intended for use in life saving medical applications. While we should be committed to ensuring the security of nuclear and other radioactive material globally, we should seek solutions that will equally ensure the continued delivery of the benefits that these materials and related applications provide.

3. IAEA NUCLEAR SECURITY PLAN OF ACTIVITIES

The IAEA's Nuclear Security Plan of Activities is founded on measures to guard against theft of nuclear and other radioactive material and to protect related facilities against malicious acts. Our work has three main points of focus: prevention, detection and response.

Our first objective is to assist States in preventing any illicit or non-peaceful use of nuclear or other radioactive material, including acts of terrorism. This requires: effective physical protection of these materials in use, storage and transport; protection of related nuclear facilities; and strong State systems for accounting for and control of nuclear material. The IAEA has been providing a range of international advisory service missions, training workshops and technical guidance documents, on nuclear security, physical protection, design basis threat assessments and nuclear material accounting, to assist States in implementing these preventive measures.

A preventive focus has also been given to securing vulnerable nuclear and other radioactive material. Working with the Russian Federation and the United States of America, we are in the process of implementing seven contracts to dismantle and transport a number of disused vulnerable sources to more secure locations. Over 20 000 curies of sealed sources from Bolivia, Côte d'Ivoire, Haiti, the Islamic Republic of Iran, Malaysia, Panama, Sudan and Thailand have been conditioned for long term storage or shipped back to the original suppliers. We expect the volume of these and other high priority assistance efforts to increase.

The second objective relates to detection, ensuring that we have systems in place that can help countries to identify, at an early stage, illicit activity related to nuclear material or radioactive sources. To this end, we have been assisting countries from many regions in training customs officials, installing better equipment at border crossings and ensuring that information on trafficking incidents is shared effectively. The IAEA database on illicit trafficking, now with a total of 80 participating countries, has proved helpful in identifying patterns of trafficking activity.

Third, we have been working with national governments and international organizations to establish and strengthen programmes to ensure that, in the event that illicit activity occurs, including acts of terrorism involving nuclear material or radioactive sources, the response can be prompt and well coordinated. To date, most such responses have involved helping governments with the recovery of radioactive sources that have been stolen or lost.

The bulk of this nuclear security activity has occurred in the past three years. Since September 2001, working in Africa, Asia, Europe and Latin America, we have conducted more than 125 security advisory and evaluation missions and convened over 100 training courses, workshops and seminars. IAEA Member States and other organizations have been generous in providing financial and in-kind resources to fund the IAEA's security related activities. Since September 2001, the IAEA Nuclear Security Fund has received over \$35 million from a total of 26 countries, as well as from the European Union (EU) and the Nuclear Threat Initiative, and many countries have provided in-kind support. IAEA Member States from every region have hosted workshops and regional training courses, participated in source recovery missions, provided technical insights on how engineered safety features at nuclear facilities can enhance security against sabotage, and contributed to the development of IAEA guidelines and recommendations.

4. COOPERATION WITH OTHER ORGANIZATIONS AND EFFORTS

I find it gratifying that in all three areas of focus — prevention, detection and response — international cooperation has been facilitated by the efforts of international organizations, including those that have cooperated with the IAEA in staging this conference: ICPO-Interpol, Europol, the European Commission, the OSCE and the World Customs Organization. Clearly, the benefits of IAEA assistance — and the reach of our limited resources — can be maximized by coordinating our activities with other international and regional organizations, as well as through the use of regional partnerships.

More than a year ago, the European Council adopted the EU Strategy Against the Proliferation of Weapons of Mass Destruction, which includes initiatives focused on keeping nuclear and other radioactive material out of the hands of extremist groups. The Global Threat Reduction Initiative has been working to systematically address each facility around the world that possesses high risk nuclear and radiological material, and many governments have already responded to United Nations Security Council Resolution 1540, which, inter alia, calls on all States to develop and maintain effective border controls and law enforcement efforts to detect and combat illicit trafficking, and to refrain from providing any form of support to non-State actors that attempt to develop, acquire, use or transfer nuclear, chemical or biological weapons or their delivery systems. The IAEA stands ready to assist States wishing to strengthen their legislative and technical infrastructures in response to Resolution 1540, by providing legal and technical advice, training and peer reviews.

Each of these efforts, properly coordinated and carried out, directly supports the overall objective of identifying and combating the risks of nuclear terrorism.

5. FOCUS OF FUTURE EFFORTS

While much progress has been made in the past three years, it is clear that the imperatives that first led to the development of the IAEA's Nuclear Security Plan have not lost their relevance or urgency. One of the purposes of this conference is to take stock of how far we have come, and I would hope that you would all provide your input on the vulnerabilities that still exist and the priorities for moving forward.

The IAEA has been conducting a major review of its nuclear security activities, and the main elements of a revised plan of activities are already emerging. One aspect of the new plan is to complete the international corpus of legal instruments, as well as relevant recommendations and guidelines. A key legal instrument is the Convention on the Physical Protection of Nuclear Material (CPPNM). For a number of years, work has been progressing on a draft amendment to the CPPNM that would strengthen its existing provisions and expand its scope to cover, inter alia, the physical protection of nuclear material used for peaceful purposes, in domestic use, storage and transport, and the physical protection of nuclear material and peaceful nuclear facilities against sabotage. In response to a request by the majority of the States Parties to the CPPNM, I have convened a diplomatic conference to be held in July to consider and adopt the proposed amendments.

In 2003 the IAEA General Conference also endorsed a revised Code of Conduct on the Safety and Security of Radioactive Sources, and in 2004 endorsed the associated guidelines on the import and export of radioactive sources. More than 70 countries have signalled their intent to follow the provisions of this Code.

A second aspect of the new plan will be to give greater emphasis to the implementation of these instruments and associated guidelines. The IAEA has already been assisting States with concrete action to improve physical protection, upgrade detection and response procedures, and improve human resource capabilities, but the extensive evaluation of the past few years has shown that gaps and unevenness in application remain. We will be giving greater focus to coordinated efforts to identify and plug those gaps, and to work towards universal application of harmonized standards based on these international instruments. The associated upgrades will be dependent on the availability of sufficient funds, provided with the flexibility necessary to be distributed in accordance with Member State needs and capacities.

A third point of focus will be to enhance the sustainability of nuclear security programmes in Member States. This will include helping States establish the needed regulatory frameworks, assisting in the implementation of international guidelines and addressing continued training needs. The IAEA has also begun to develop integrated nuclear security support plans with individual Member States as frameworks for helping to address their nuclear security needs over the longer term.

6. CONCLUSION

At the outset of this statement I emphasized that security strategies could no longer be effective if based solely on the concept of boundaries, and throughout this presentation you have heard me discussing cooperation, assistance, regional and international networks, and the importance of learning from each other. In effect, what we are discussing is a security culture, a mindset that, while providing the impetus for local and regional action, thinks globally and is fully capable of extending across borders. Ultimately, our success will only be as strong as our weakest link.

OPENING ADDRESS

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1. INTRODUCTION

It is my pleasure to welcome you to London for the International Conference on Nuclear Security: Global Directions for the Future. I am grateful to the Director General of the IAEA, Mohamed ElBaradei, for inviting me to act as Conference President, and for the chance to address you this morning. A gathering of so many key policy makers in the field of nuclear security presents an excellent opportunity to engage in a serious and wide ranging debate, sharing experience and best practice, and forging strong partnerships and synergies that will form the backbone of our future work.

This morning I would like to briefly set our global effort in context, examining how we can best look to the future in the light of our past achievements and present challenges.

2. PAST ACHIEVEMENTS

The dawn of the nuclear age brought with it a new power, terrifying in its ability to destroy, awesome in its potential for good: it is the same stark contrast that confronts us today. On the one hand, as the technological expertise in handling its by-products develops, and with the growing realization of humanity's impact on its surroundings, nuclear power represents an important, climate friendly supply of energy. Moreover, its applications stretch far beyond civil nuclear power — food preservation and disease prevention are being revolutionized by nuclear technology, and, indeed, nuclear power will almost certainly be necessary if we are to continue our adventure of exploration beyond our solar system.

However, if we are to continue to reap the benefits of the atom, we must keep in check its associated dangers, and prevent a technology with the power for so much good from falling into the hands of those that would use it to harm and destroy. Nuclear security plays a vital role in this endeavour.

The Treaty on the Non-proliferation of Nuclear Weapons, or NPT, has been a significant and, to many, an unexpected success in restraining nuclear proliferation and providing a secure framework for the peaceful transfer of nuclear technology. The United Kingdom continues to believe in the central importance of all aspects of the NPT, and regards it as the cornerstone of the non-proliferation regime.

Alongside the NPT, the IAEA has played a crucial role in promoting and aiding nuclear safety and security, championing the peaceful use of nuclear science and technology and encouraging and enforcing safeguards that protect nuclear material and prevent its diversion to harmful uses. Both the NPT and the operations of the IAEA face serious challenges. In our view, this is not a reason to be downhearted and to reject one of the best examples of effective multilateralism; rather, it amounts to a clear call for enhanced international efforts to strengthen the system and make it work better for the future. We are in London, but do not let anyone claim that nuclear security and nuclear non-proliferation are just the concern of the UK and a few of our allies and partners. The international nature of this conference, the central role in it of the IAEA, and the participation of representatives from so many countries, demonstrates better than any speech that we are dealing with global concerns. Only international action can meet the challenge.

3. PRESENT CHALLENGES

The end of the Cold War brought new hope, but also new challenges. The threat to global security has changed, and we too must change to address it.

Some have sought to articulate the security landscape we now face. The most enduring image of the Cold War was an iron curtain — a hard, impenetrable divide wrought in the crucible of two opposing ideologies. Today's divide more closely represents the warren of mountain tunnels in which some terrorists have sought to shelter. The line of demarcation has become porous and ephemeral, eluding clear sight or depiction.

Similarly, the nuclear landscape no longer rests chiefly on a balance of poles, but on a balance of wills. Individuals willing to take their own lives as they destroy others are not deterred by conventional logic — those with few or no material assets, who often view their own destruction as a prize, cannot be dissuaded by deterrents, whether they be conventional or nuclear. The threat of a dirty bomb in the hands of a terrorist, with the ensuing panic, chaos and disruption it would cause, is a spectre difficult to contemplate.

For this reason, while regional proliferation between States remains of serious concern, a key focus for this conference will be the threat from sub-State actors or criminals acquiring a weapon of mass destruction or mass disruption. A key question we will need to ask, and indeed I very much look forward to Senator Nunn's keynote address on this issue, is how we can adapt our non-proliferation machinery to address, and eventually overcome, global terrorism.

We must be careful, however, not to isolate one form of terrorism, nor to let our response demonstrate the same discrimination and destructiveness its creed betrays. Whatever the final solution, it must encompass all geographical, social and religious communities.

4. LOOKING TO THE FUTURE

How then can we address these problems for the 21st century?

There must be a dual thrust from the international community, firstly to act swiftly and decisively to prevent weapons of mass destruction from falling into the hands of terrorists, and, secondly, to embrace a long and broad-reaching campaign against the causes of terrorism, whether they be hatred or hunger, politics or poverty.

As the first element of this strategy, nuclear security represents our frontline of defence, but also our most likely vulnerability to attack. The number of nuclear and radiological sources is vast, and the challenge in securing them formidable. When only one such source could form the genesis of a catastrophic attack, the task seems overwhelming; however, we must not give up. It is entirely right that the people in this room are counted among our most valued assets in our struggle against the nuclear threat. We must act quickly and in unison if we are to minimize the immediate danger.

To this end, the UK is already engaging in a number of endeavours, often alongside international partners and friends. I would like to highlight a few very briefly.

We are committed to playing an active role in the global partnership against the spread of weapons and materials of mass destruction. We have committed $750 million, and are already well ahead with practical programmes in several countries of the former Soviet Union. Collaboration with other donor countries has been a major element in the success of our work to date. During our presidency of the G8 we are focusing attention on ensuring the effective implementation of global partnership projects, and we are at the same time initiating an important consultation on priorities for the future.

Examples of such projects include the dismantling of nuclear submarines, assisting in the safe and secure storage of spent nuclear fuel, creation of new employment opportunities for former nuclear scientists and engineers and contributing to the international effort to destroy the Russian Federation's chemical weapons stocks. A key area of advance during 2004 was the development of the UK's nuclear security programme, from strategy to the first stages of implementation. During 2005 we hope to complete the initial pilot project in collaboration with Rosatom and intend to roll out further projects in this area over the course of 2005 and beyond. Work in the area of nuclear security will make up an increasing proportion of the UK's projects under the global partnership in future years.

Domestically, the UK has thoroughly reviewed its own nuclear security regulatory regime since the events of 11 September 2001, and has introduced a new, modernized legal framework to underpin the regulatory arrangements already in place. This is, of course, an ongoing process, and we are committed to maintaining and developing this framework further. Internationally, the UK has participated actively in efforts to amend the Convention on the Physical Protection of Nuclear Material. We look forward to a successful diplomatic conference in July that agrees the proposals put forward to strengthen the convention, extending its scope to cover the physical protection of nuclear material in domestic use, storage and transport.

Finally, the UK has been a strong supporter of the IAEA Nuclear Security Fund since its inception in 2002. We believe that the IAEA has a unique role to play in coordinating, complementing and enhancing activities being undertaken at the national level. So far, we have donated nearly £1 million to the fund. Today I am happy to announce that the UK has agreed to demonstrate again its support of the Nuclear Security Fund by contributing a further sum of £350 000. This money will be used by the IAEA to support a range of activities in its nuclear security programme.

I would like to emphasize once more that in all these projects we have been fortunate to work alongside or build on the achievements of others. In addressing the problems we face, the UK firmly believes that it is neither desirable nor possible to stand alone; nor can we afford to work only within existing frameworks — the purpose of this conference is not to look back, but to look forward, considering new approaches and strategies.

In closing, I would like to return to the second prong of our approach in tackling nuclear terrorism. One of the UK's key objectives for its European Union and G8 presidencies, as well as for its long term policy, is to attempt to redress some of the imbalances that scar our world and our collective conscience. This stems from a belief that the responsibility for the existence of the present global problems, together with the burden of their resolution, must be shared. In this regard, a war on terror cannot be a war between nations and ideologies, but rather a shared struggle to defeat terrorism and its causes. It should include a war on poverty and a war on inequality. If we wish freedom and security for ourselves, we must become slaves to the cause of the freedom and prosperity of all.

It is in this spirit that I welcome you once more to London, and thank you for sharing this endeavour with us. I sincerely hope that we will, indeed, find a global direction for the future.

KEYNOTE ADDRESS

THE RACE BETWEEN COOPERATION AND CATASTROPHE

Senator S. Nunn
Co-Chairman, Nuclear Threat Initiative

Former United States Secretary of State Dean Acheson, when asked to give a definition of foreign policy, replied: "It's one damn thing after another." Today, in our quest to prevent nuclear proliferation and to prevent catastrophic terrorism, we are faced with one damn threat after another and one damn change after another. Our most dangerous threats have changed quickly and our responses are changing very slowly — far too slowly. We are in a race between cooperation and catastrophe, and the threats are outrunning our response.

If a nuclear weapon were detonated in London, or in any of the world's major cities, it would change our world forever. Beyond the horror and the immediate death, and the lives that would be shortened by radioactive fallout, the casualties could also include civil liberties, privacy, world confidence and the global economy.

With so much at stake, our citizens have every reason to ask: "Are we doing all we can to prevent a nuclear attack?" My emphatic answer is "No, we are not." We have, however, taken some important steps, including:

— The Nunn–Lugar Cooperative Threat Reduction programme, working since 1991 to secure and destroy weapons and material in the former Soviet Union. This programme helped Kazakhstan, Ukraine and Belarus get rid of all their nuclear weapons, a historic achievement.
— The G8 commitment launched three years ago to create and fund the Global Partnership Against the Spread of Weapons and Materials of Mass Destruction.
— The recently launched US–Russian Global Threat Reduction Initiative to remove and secure high enriched uranium from research facilities around the globe.
— The IAEA Nuclear Security Fund, launched to help Member States strengthen the security of nuclear material worldwide.
— The commitment by Libya to give up its nuclear weapons programme following skilful diplomacy led by the United Kingdom and the United States of America, with important oversight by the IAEA.

— The recent Bush–Putin summit, in which the President of the Russian Federation and the President of the USA each made a personal commitment to enhance and accelerate efforts to secure nuclear weapons and nuclear material worldwide.

These are all indispensable steps for global security, but we have miles to go before we sleep. We must remove roadblocks, we must provide more resources, we must convert pledges to programmes and words to deeds. We must develop a global partnership against catastrophic terrorism that is effective, focused and truly global. This includes every nation with material to safeguard and every nation that can contribute to safeguarding it.

Increasingly, we are being warned that an act of nuclear terrorism is inevitable. I am not willing to concede that point, but I do believe that unless we greatly elevate our effort and the speed of our response we could face disaster.

Let me explain my sense of urgency by describing three nuclear related threats we face today.

Threat 1: A terrorist attack with a nuclear weapon. Imagine the following scenario: under cover of darkness, terrorists slip into a nuclear research reactor in Belarus. Assisted by insiders, they take 50 kg of high enriched uranium and head for a safe house that is equipped with machine tools, chemicals, bomb designs, everything necessary to turn a terrorist group into a nuclear power.

A few days later, intelligence agents discover the safe house, in which they find machine tools with traces of high enriched uranium, but no bomb. The combined security forces of many governments deploy to guard hundreds of ports and airports and thousands of miles of coastline. Yet the bomb moves through a border crossing — undetected by radiation sensors because it is shielded by a thin layer of lead. At midday in a city of several million people, the world suffers its first nuclear strike in 60 years.

The day after, what would we wish we had done to prevent it?

— We would wish that the world's top security priority had been a global effort based on best practices to upgrade the security of all nuclear weapons and weapons usable material and to promote a culture of security at all our facilities. As Graham Allison has said, we must protect this material as well as the USA protects Fort Knox and the Russian Federation protects the Kremlin jewels.
— We would wish that the G8's Global Partnership had turned its pledges into programmes and directed its resources aggressively against the most urgent dangers, as it committed to do almost three years ago in Canada.

— We would wish we had moved faster to implement the Global Threat Reduction Initiative to remove and secure nuclear weapon material from research facilities around the world.
— We would wish we had adopted the recommendations of Director General ElBaradei, by putting a moratorium on additional facilities for uranium enrichment and converting existing reactors to low enriched uranium, thereby cutting off the wide distribution of this bomb making material around the globe.
— We would wish that the USA and the Russian Federation had insisted on bilateral transparent accountability of tactical nuclear weapons in both the US and Russian arsenals.

The day after, I believe we would wish we had done all these things. Why aren't we doing them now?

Threat 2: A terrorist attack with a dirty bomb. Now, imagine the following scenario: a terrorist group with insider help acquires a dangerous quantity of ^{137}Cs from a medical facility. The terrorists use conventional explosives to incorporate the powdered caesium chloride into a dirty bomb and detonate it in the financial district of Paris or London or Tokyo or Beijing or Moscow or New York, dispersing the caesium isotope across a 60-square block area. The explosion kills a couple of dozen people and millions evacuate the city in panic. Billions of dollars worth of real estate is declared uninhabitable. Cleanup is estimated to take years and cost additional billions.

The day after a dirty bomb attack, what would we wish we had done to prevent it and to mitigate the damage if it occurs?

— We would wish that we had worked harder to develop a risk based global inventory of vulnerable radioactive sources and had better prioritized our efforts to secure them through a partnership effort around the globe.
— We would wish that we had worked harder to secure radioactive sources at each stage of their life cycle, from their production through their shipment, use and disposal — a cradle to grave approach to dangerous nuclear material.
— We would wish that we had ensured that first responders had plans, protective gear and decontamination equipment in place to respond to an attack, and that we had mounted a serious public education and training programme to mitigate the consequences of the attack.

The day after, I believe we would wish that we had done each of these things. Why aren't we doing them now?

Threat 3: A sharp increase in the number of nuclear weapon States. Imagine the following scenario: North Korea continues to turn its spent nuclear fuel into bomb grade plutonium and manufacture nuclear weapons, and then suddenly tests a weapon, as India and Pakistan did in 1998. Nationalists in Japan and South Korea push their governments to develop nuclear weapons. China, in response, expands its own nuclear weapons arsenal and joins the USA and the Russian Federation by putting its weapons on a hair-trigger state of readiness. Iran continues playing cat and mouse, until it has developed enough high enriched uranium to build several nuclear weapons.

As Iran and North Korea become nuclear weapon States, other nations re-examine their options. Before a decade passes, Egypt, South Korea, Japan, Saudi Arabia, Brazil, Argentina and Indonesia have become nuclear powers, provoking greater regional tensions, greater pressure on other nations to go nuclear, greater chances of nuclear accidents and greater danger that weapons or material could fall into terrorist hands. The Treaty on the Non-proliferation of Nuclear Weapons becomes an artefact of history.

After this occurs, what would we wish that we had done to prevent it?

— We would wish that we and our allies had developed a time urgent, coordinated and direct diplomatic approach with North Korea and Iran to end their nuclear weapons programmes, using both carrots and sticks. I am pleased that last week's announcement of the US–European initiative on Iran seems to be moving in that direction. At this stage, I would call it creeping cooperation.
— We would wish we and other nations had insisted on a system of stronger rules and stronger enforcement, or, as the Carnegie Endowment termed it, 'Universal Compliance', to prevent nations from acquiring a nuclear weapons capability.
— We would wish that we had created a nuclear cartel made up of States with fuel cycle facilities that would guarantee nuclear fuel at favourable market rates to other States, thereby removing any pretext for other States to develop enrichment capabilities of their own.
— We would wish that the nuclear weapon States, especially the USA and the Russian Federation, had visibly and steadily reduced their reliance on nuclear weapons at a time when we were asking others to renounce nuclear weapons. In other words, we would wish that we had set an example of devaluing rather than enhancing the importance of nuclear weapons. As Director General ElBaradei has said, it is hard to tell people not to smoke when you have a cigarette dangling from your mouth.

How do the nuclear powers get the cigarettes out of their mouths after five decades of chain smoking? I have a few suggestions:

— The USA and the Russian Federation could follow the Treaty of Moscow with other substantive actions, by adding benchmarks for progress, mechanisms for verification, timetables for reductions and a mutual pledge to eliminate warheads, not just delivery mechanisms.
— The USA could move forward with the Comprehensive Nuclear-Test-Ban Treaty and work towards ratification of this Treaty along the lines that former Chairman of the Joint Chiefs General Shalikashvili outlined in 2001.
— The USA and the Russian Federation could recognize that our very survival depends on the accuracy of each other's early warning systems. We could follow through on the initiative begun in 1998 to develop a joint early warning centre to prevent false warnings and greatly reduce the danger of a catastrophic mistake. (Who knows? This concept could spread to other nuclear States, perhaps India, Pakistan and China.)
— The USA and the Russian Federation could remove their weapons from hair-trigger alert so that both leaders would have more time to gather data, exchange information, gain perspective, discover an error and avoid an accidental, mistaken or unauthorized nuclear launch.

The day after we wake up and discover several new nations with their fingers on the nuclear trigger and with dramatically increased opportunity for terrorists to gain nuclear material, I believe we would wish that we had done all of these things. Why aren't we doing them now?

No matter where you call home, the central organizing security principle of the 21st century should be to prevent the spread or use of nuclear and other weapons of mass destruction. For this mission we need all the tools in all of our collective arsenals. The IAEA is front and centre in this quest. We must strengthen its mission, its authority and its resources.

We know what it looks like when the leaders of the world unite, when they listen to each other, when they work as a team in confronting common threats. We will recognize it when we see it, but the clock is ticking. We are in a race between cooperation and catastrophe. If we have a nuclear disaster, the world will demand immediate action. Why wait until the day after? We must do it now.

FACING THE CHALLENGES

(Session 1)

Chairperson

S.B. ELEGBA
Nigeria

NUCLEAR SECURITY CHALLENGES: JAPAN'S VIEW

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1. IMPORTANCE OF NUCLEAR SECURITY

Since the terrorist attacks on 11 September 2001, the international community has reviewed and strengthened measures against terrorism in a wide range of areas with a sense of urgency. However, terrorist organizations are increasing their capabilities in carrying out activities such as crossing borders, acquisition of funds and weapons, propaganda campaigns, and making use of advanced science and technology.

Strengthened nuclear security measures have particular importance in the fight against terrorism. Nuclear terrorism, should it happen, could cause immeasurable damage and psychological impact on our whole society. Therefore, we should make the utmost effort to take the necessary measures as extensively as possible in order to protect society from nuclear terrorism.

2. THE IAEA'S ACTIVITIES

Let me briefly touch upon the importance that the Government of Japan attaches to the IAEA's role in the field of nuclear security. Immediately after 11 September 2001, the IAEA took concrete action, including the drafting of a plan of activities for nuclear security and an appeal for the establishment of the Nuclear Security Fund for implementing the plan.

The IAEA has played a significant role in enhancing physical protection through a series of revisions of guidance. The latest document, INFCIRC/225/Rev.4, which includes design basis threats, provides valuable guidance to Member States. For the efficient physical protection of nuclear material, it is highly commendable to expand its scope from international transport to inland transport, usage, storage and nuclear facilities themselves. In this context, we welcome the fact that momentum has been built up since last summer to amend the Convention on the Physical Protection of Nuclear Material. We expect that the IAEA diplomatic conference will successfully conclude negotiations this July.

Considering their relative widespread availability and possible diversion to a dirty bomb, the management and control of radioactive sources is no less urgent than the protection of nuclear material. In this respect, we appreciate the efforts made by the IAEA in formulating the Code of Conduct on the Safety and Security of Radioactive Sources as well as the Guidance on the Import and Export of Radioactive Sources. Furthermore, we recognize the IAEA's consistent approach to universalize the Additional Protocol with a view to strengthening the safeguards system. Its universalization will contribute to enhancing nuclear security, with better tools to detect undeclared nuclear activities in a State.

While the IAEA has been playing an important role in making rules and regulations in this field, it is the responsibility of Member States to implement them, especially INFCIRC/225/Rev.4, the Code of Conduct on the Safety and Security of Radioactive Sources and the Guidance on the Import and Export of Radioactive Sources.

3. JAPAN'S MEASURES

Let me now turn to the various counterterrorism measures that the Japanese Government has undertaken.

Regarding international conventions and protocols to curtail terrorist activities, Japan has already concluded and implemented all the 12 counterterrorism conventions and protocols. Also, Japan has been making stringent efforts to fully implement United Nations Security Council Resolutions 1373 and 1540 and other relevant United Nations Security Council resolutions. Japan supports reaching agreement on the amendment of the Convention on the Physical Protection of Nuclear Material in July and the early conclusion of the negotiations on the International Convention for the Suppression of Acts of Nuclear Terrorism. With a view to strengthening nuclear security, Japan has been actively promoting the universalization of the Additional Protocol in cooperation with the IAEA and the States concerned.

As for the domestic implementation of rules and regulations in the field of the physical protection of nuclear material and nuclear facilities, Japan is in the process of strengthening the regulatory framework by introducing a design basis threat approach and an inspection system to verify continued compliance, together with the employment of inspectors. In addition, a legal confidentiality obligation for operators and their employees engaged in physical protection measures will be established.

The maritime transport of nuclear and radioactive material is indispensable for Japan. As a country surrounded by sea and without significant indigenous resources, it is indispensable in order for Japan to ensure a stable and efficient supply of nuclear energy. I can assure you that the maritime transports in which Japan has been involved have been carried out safely in the past 30 years, and that such transports have been undertaken by strictly implementing safety measures to satisfy the standards of the IAEA and the International Maritime Organization.

With regard to international cooperation, the Government of Japan provides assistance by utilizing the accumulated Japanese experience in the fields of the peaceful uses of nuclear energy and by active participation in expanding and streamlining IAEA safeguards. This assistance has centred on the area of accountancy and control of nuclear security. Japan also shares experience gained through implementing counterterrorism conventions with the States concerned and hosts seminars and training courses on nuclear safety regulations in an effort to strengthen physical protection measures for nuclear material and facilities. The Japanese Government will continue to provide assistance in the areas in which it has a comparative advantage.

4. FUTURE DIRECTIONS

As for possible future directions, setting specific targets and long term objectives are issues of great importance for the international community. In our view, specific targets would include the following: firstly, the early conclusion of negotiations to amend the Convention on the Physical Protection of Nuclear Material; secondly, the implementation of INFCIRC/225/Rev.4, the Code of Conduct on the Safety and Security of Radioactive Sources and the Guidance on the Import and Export of Radioactive Sources; thirdly, strengthening activities under the Nuclear Security Plan of Activities; and fourthly, universalization of the Additional Protocol. The long term objectives may include strengthening the IAEA guideline on physical protection measures, taking into account realistic situations involving terrorists. Closer coordination of safety measures in nuclear facilities would also be necessary.

Effective nuclear security measures are closely linked to other counterterrorism measures such as immigration control, aviation security, port and marine security, customs cooperation and export control. In this context, all States concerned are encouraged to cooperate closely, by utilizing their respective advantages, to enhance the standard of international counterterrorism measures and thereby to further coordinate and strengthen comprehensive measures, while the IAEA is encouraged to coordinate closely with other international organizations in this field.

The Government of Japan sincerely hopes that the IAEA will continue to play a pivotal role in the field of nuclear security, utilizing the accumulated experience and expertise it possesses. Japan will spare no efforts to support the important activities that the IAEA is implementing.

PERSPECTIVES OF A CONCERNED DEVELOPING COUNTRY

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We convene today against a backdrop of disturbing developments that have taken place in the field of nuclear disarmament and non-proliferation over the past 15 years. Every nation on Earth holds high stakes in the promotion of these twin goals; however, whichever way we choose to set our sights, we find today that confidence is eroding in the process agreed upon and generally entrusted with fostering those objectives for four decades.

The views I would like to convey to you are therefore not exclusively those of a developing country. For all our countries are at various stages in the development process of peaceful nuclear applications, especially as concerns the production of energy for a post-Kyoto world.

On the issue relating to nuclear material reaching unauthorized actors, we should do our utmost in order to prevent theft or the unaccountability of radioactive material. Having said that, I am not convinced that non-State actors can on their own develop nuclear weapons or any other explosive nuclear device without the help of a State. The question therefore is one of ensuring that security measures are effective and implementable. I leave it to others more knowledgeable than myself to dwell on this issue during the forthcoming days of this conference.

Nevertheless, the matter that I have chosen to focus on has the potential of creating a rift, as if one more were needed, between those countries that are more fully developed, in the economic sense, and those, like my own, that are still climbing the steep learning curve of late industrialization, and many of those that, although at present in the lower rungs of development, may have to turn eventually to the peaceful applications of nuclear energy to increase their chances of achieving a modicum of prosperity and decent living conditions for their populations.

To foster the development of peaceful nuclear applications was a central part of the bargain struck at the creation of the nuclear disarmament and non-proliferation regime. This bargain brought forth the IAEA and the Treaty on the Non-proliferation of Nuclear Weapons (NPT), and later created the political conditions for that treaty to become a permanent, quasi-universal regime.

Lately, however, concerns with non-proliferation have tended to monopolize everyone's attention, to the detriment of the necessary balance that presides over that bargain. No issue is as central in that regard as the nuclear fuel cycle.

The crux of the matter here seems to be increasingly diverging views as to what the bargain is about. For those countries still struggling with climbing the slope of the learning curve of mastering that cycle, their efforts are protected by the "inalienable right" to develop nuclear technology for peaceful purposes. Not every country, it should be added, has chosen to master the fuel cycle, or can afford to do so. Even so, it would seem that for some of those other countries that have already mastered that cycle, to allow any others to imitate them implies an unacceptable risk of diversion for nuclear weapon programmes.

The concern that peaceful nuclear programmes may be used as a cover for nuclear proliferation is shared by all. However, the proposals that have been made to counter this shared concern tend, on the one hand, to ignore the successful track record of the system of safeguards now in place for non-nuclear-weapon IAEA Member States, and, on the other hand, wrongly blame the NPT for alleged loopholes that are assumed to render it ineffective to combat nuclear proliferation.

The recurring allegations that the IAEA has failed in its efforts to check proliferation by means of its safeguards system cannot be substantiated. We know now that Iraq conducted an illegal nuclear programme, that Libya tried to obtain nuclear weapon technology and that Iran failed to declare nuclear activities for nearly two decades: all of this was uncovered under the aegis of the comprehensive safeguards system now in place.

Similarly, a level headed view of the facts proves NPT bashers to be wrong. In the 1960s it was projected that by 2000 about 30 States would be nuclear armed. The number is currently ten — that is, the five States that had crossed the nuclear weapon threshold before 1970 and another five States that are known to have nuclear weapons, or are suspected of having them, or are generally held as having the technical expertise and the political will to produce such weapons. Whatever interpretive flavour one may choose, the fact is that three out of five of those States adamantly refused to join the NPT regime, while one of the five has recently walked out of it, after years of less than subtle manoeuvres to hide its proliferation intentions.

Where does that leave us? Not surprisingly, a discussion based on flawed premises will not take us very far. I would like to point out major flaws in some of the proposals being fielded nowadays to curtail the dissemination of the nuclear fuel cycle. Indeed, the current debate on the nuclear fuel cycle is inconsistent from the political, technological and legal standpoints. These inconsistencies may ultimately jeopardize the efforts of the international community in combating nuclear proliferation.

— To wilfully deny access to technology in order to curtail the number of countries that may conduct peaceful uranium enrichment activities unduly interferes with a process that has evolved naturally, as a result of market forces. Worse, this interference has the potential to disrupt and even reverse present trends. I refer here to the considerable number of countries that have mastered the technology of uranium enrichment but that have decided on their own to suspend its practical implementation or not to implement it at all, as a result of purely domestic considerations. One may not discard the possibility that, faced with the prospect of prohibitions, embargoes or confiscation, many of these countries may choose to revisit their former decisions and to resume their activities in the field of enrichment.
— Prohibition or outright confiscation would create a new cleavage between the 'haves' and the 'have nots', which was admitted, as a very particular exception, in the case of nuclear weapons under the terms of the NPT bargain. Such a development would lead to a regrettable scenario, in which the goodwill of the international community would have led to the creation of a monopoly on the development of nuclear technologies to the sole benefit of those parties that currently lead the field.
— To offer guarantees of a steady flow of nuclear fuel to those parties that foreswear their NPT given rights is unrealistic to the point of naivety. It would be very unlikely for a State to relinquish its energy security and to transfer it to a cartel that would thus be institutionalized. It would also seem improbable that countries such as the United States of America would be willing to hand over the management of their enrichment or reprocessing facilities to international organizations.
— The current debate ignores the political and strategic dynamics of nuclear proliferation. Beyond strategic considerations caused by regional circumstances (e.g. the Middle East or South Asia), one should include that the continuing relevance of nuclear arsenals in the military doctrine of certain countries, as well as the news of the impending development of new weapons and of de rigueur rationalizations to justify their use, even against non-nuclear States, are some of many sources of concern that may ultimately make it increasingly attractive to militarize a nuclear programme.

The debate on ways to check nuclear proliferation is a crucial one, especially in light of the risks posed by the possibility that nuclear material, equipment or technologies may fall into the hands of terrorists. Here are some issues that I believe merit close consideration in order to move our agenda forward:

— Nuclear non-proliferation and nuclear disarmament are two sides of the same coin. It would be unthinkable to implement a sustainable non-proliferation strategy, in the long run, in the absence of accompanying measures in the field of nuclear disarmament that are both concrete and multilaterally verifiable.
— The universalization of the NPT and its full and balanced implementation are necessary conditions for our efforts to attain sustainability.
— Strengthening domestic and international control of transactions involving fissile material and associated technologies is a must. In this context, United Nations Security Council Resolution 1540 is especially relevant, as it points the way to a workable control system.
— Non-proliferation should be approached in a holistic manner. Besides trying to understand the sources of proliferation dynamics, and to reduce tensions by diplomatic means, and strengthening domestic and international controls on transactions, it is also necessary to detect, monitor and lawfully forestall financial transactions and flows associated with illicit nuclear activities. In this context, best practices from other fronts, for example fighting international organized crime syndicates and illicit drug trafficking, could be harnessed in order to penetrate and dismantle the clandestine networks involved with dual use technologies.
— It should also be pointed out that we must correct the distortions that impair our ability to focus the current debate on nuclear technology development and utilization. Until recently, the main focus of debate was defined by the types of use of nuclear technology (i.e. military use or use for peaceful purposes). The current debate, however, has migrated to focus on assessing the user — that is, a spurious cleavage has begun to set in that attempts to distinguish between 'responsible' and 'irresponsible' States, a cleavage that ultimately only yields an increasing degree of arbitrariness in the system. Responsibility and irresponsibility relate to the historical record of compliance or failure to comply.

LEARNING FROM FAILURE OR FAILURE TO LEARN: LESSONS FROM PAST NUCLEAR SECURITY EVENTS

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1. INTRODUCTION

Since the terrorist attacks of 11 September 2001 many governments and the IAEA have pledged to take additional significant steps to reduce the risk that terrorist organizations will acquire nuclear material or weapons. It is by no means clear, however, that the efforts undertaken thus far have been commensurate with the urgency and magnitude of the threat. Government policies are sticky, international and domestic bureaucracies are often slow to adapt to new challenges, and global cooperation is difficult to create and sustain. Given the magnitude of the threat, each government needs to learn from its own and other governments' successes and failures in this global effort to reduce the danger of terrorism. Organizational learning is, however, notoriously difficult, especially concerning nuclear physical security policy, an arena in which governments often want to protect secrets about their programmes, bureaucracies want to protect their autonomy from outside influence, and individuals and subunits want to protect their reputations and budgets.

My central argument in this paper is that the international community needs to make far greater efforts than it has thus far to encourage 'vicarious learning' between the organizations involved in nuclear physical security in every country around the globe. The new terrorist problem is a global one, and solutions will therefore also have to be global in nature. This paper will outline the serious, diverse and long term nature of the threat, explain why global cooperation in nuclear security is needed, and provide some specific examples of successes and failures from which we might learn important lessons for unilateral and multilateral policy initiatives that could lead to improved physical security.

I want this paper to be both a challenge and a provocation. It should challenge the reader to think about ways in which organizational learning can be improved and will provide examples of successes and failures that may lead to better than best practices in nuclear security. It should provoke the reader to ask whether he or she really has done everything possible to reduce the risks of nuclear terrorism. We all know that a nuclear terrorist incident is possible in the future. If it occurred, would you be able to say that your organization and the international community had done everything it could have to reduce the likelihood of that attack?

2. A DIVERSE AND LONG TERM THREAT

The problem of nuclear terrorism has a long history, and unfortunately will also be with us for a long time in the future: the risks of terrorists obtaining and using nuclear weapons or radiological devices existed before Osama bin Laden formed Al-Qaida and will continue to exist even if Al-Qaida is significantly weakened or destroyed in the future. In 1998 Osama bin Laden declared that it was "a religious duty" for Al-Qaida members to get nuclear weapons. Evidence that he had instigated more than one unsuccessful effort to acquire nuclear weapons and material was discovered in Afghanistan after the war, and documents discussing nuclear weapon designs and outlining how to make a crude nuclear device were found in the Kabul home of a senior Al-Qaida official. Bin Laden's nuclear ambitions, however, did not vanish when he vanished from the caves in Tora Bora. In June 2002 José Padilla, an Al-Qaida operative, was accused of being sent to the United States of America in order to plot a dirty bomb attack. In May 2003 a Saudi cleric — Sheik Nasir Bin Hamid al-Fahd — issued a fatwa (an Islamic decree) justifying the use of nuclear weapons against the USA, claiming that Islam recognized no restrictions on the use of such indiscriminate weapons in what he saw as a "defensive war" against "the crusaders". Was this fatwa issued at the request of bin Laden in preparation for a possible attack? We do not know, nor is it clear whether al-Fahd's repudiation of some of his past statements as "mistakes", issued after he was arrested by Saudi authorities in November 2003, included this nuclear fatwa. What is clear is that in January 2005 two alleged Al-Qaida operatives were arrested in Mainz, Germany, and were charged with attempting to purchase high enriched uranium in Luxembourg. It is unlikely that this foiled attempt to acquire nuclear material for Al-Qaida will be the last one.

It is important to keep in mind, however, that other types of terrorist groups have coveted nuclear weapons or material in the past and are likely to do so in the future. The Aum Shinrikyo, the Japanese millenarian terrorist organization, sought to acquire nuclear weapons, but had to settle for chemical (Sarin) and biological (anthrax) weapons when its nuclear ambitions were thwarted. The Bader–Meinhoff gang attempted to steal nuclear weapons from a US military base in western Europe in the late 1970s. In the USA, members of radical Christian organizations (such as the Covenant, Arm and the Sword) and neo-Nazi groups (such as the National Alliance and the Aryan Nation) have advocated mass murder of their purported enemies and have been caught with biological and chemical agents. Moreover, we should be concerned about the 'copycat phenomenon', whereby terrorist organizations adopt the strategies and tactics of other terrorist organizations, which has been common in the past. Finally, there has been a general trend in the tactics of many terrorist organizations towards creating mass and indiscriminate civilian casualties rather than more targeted attacks on military personnel or political leaders. All of these factors suggest that we should expect a continuing terrorist interest in weapons of mass destruction, including nuclear material and weapons, in the future, regardless of what happens to the Al-Qaida network.

Is the international community taking an appropriately long term perspective on this problem? I fear not. Many sensitive nuclear related sites in the former Soviet Union, for example, have received emergency improvements in their physical security, but it has been widely reported that many of these improvements lack 'sustainability', and broken equipment and lack of funds and personnel for ongoing maintenance is a chronic problem. The international community certainly needs to move quickly to lock up nuclear material effectively, but it also needs to do so in a manner that provides adequate protection over the long term.

3. THE NEED FOR COOPERATION

All States are hostages to each other's nuclear physical security measures today. The theft of a single nuclear weapon or a significant quantity of nuclear material in any country poses a risk for all countries. Governments in each of our countries therefore have a legitimate interest in gaining reassurance that others are maintaining adequate physical security.

How can this be done without much deeper involvement of the IAEA with the nuclear establishments of individual States? There are currently no required global standards for the protection of fissile material outside of those in international transit, an issue that parties to the Convention on the Physical Protection of Nuclear Material are working on in earnest. The IAEA (in INFCIRC/225/Rev.4) does recommend that every government develop a design basis threat (DBT) to set the characteristics and capabilities of terrorist threats against individual facilities, to be used to design and evaluate physical protection systems, but there is no required minimum DBT and therefore no minimum levels of security are required today. It is thus perfectly possible that a State with nuclear material would determine that there is no serious terrorist threat to its facilities and that it would be following the IAEA recommendations and still not have armed guards at nuclear sites. There are also no requirements for sharing DBT decisions (this could presumably be for security reasons), but the process and intelligence on which DBTs are based and information on how facilities are evaluated could be shared more widely than is the case through the voluntary IAEA security training programmes today. Even if more detailed standards are developed and disseminated, serious questions will remain about whether all governments have implemented such standards throughout their civilian and military related nuclear complex.

The United Nations Security Council has issued Resolution 1540, requiring all Member States to develop adequate nuclear non-proliferation export control mechanisms, but serious obstacles must be overcome before the United Nations can determine that Resolution 1540 has been implemented. What are the standards to be applied? How will the United Nations determine that the standards have been met? I think it is possible that more rigorous requirements for the physical security of all nuclear material and weapons will be included in the future under the rubric of Resolution 1540.

Moreover, an international multilayer concept of defence is clearly needed to supplement efforts to mandate stronger domestic controls. Nuclear non-proliferation and disarmament are the first line of defence: if fewer States have nuclear weapons and those that have them reduce the size of their arsenals, the protection of existing weapons becomes more manageable. Protecting nuclear weapons and material at their storage sites, in transport or in other facilities is the next line of defence. The next line of defence is improved export control capacity and border monitoring programmes to detect smuggling of nuclear material out of its country of origin. The Proliferation Security Initiative provides one additional line of defence, attempting to interdict smuggled nuclear material in transit. Finally, homeland security efforts — identification, warning and mitigation programmes — at national borders and inside a country are the final line of defence. None of these tasks can be accomplished as effectively as possible, however, without cooperation from other States' intelligence and nuclear security organizations.

4. GOVERNMENTS SHOULD DISCUSS BEST ORGANIZATIONAL PRACTICES

Governments should constantly review their own policies to ensure that they are following organizational best practices to meet the high standards of nuclear security that are warranted today. In order to enhance security in other States, however, policy reviews and learning must not stop at each border. Our governments should be willing both to discuss organizational best practices with each other and to provide assurances to other States that any necessary security improvements are being implemented in a prompt and effective manner.

High level professional discussions could usefully review the existing policies and implementation of the following nuclear security programmes in each of our countries:

(a) Personnel reliability programme (PRP) regulations. PRPs are designed to prevent an unstable individual or one with potential terrorist ties from being in a position to acquire access to nuclear weapons, material or command and control over them. Some limited international discussions of PRP programmes have taken place, but these should be extended to include detailed analyses of the adequacy of existing PRP rules and implementation procedures.

(b) Nuclear emergency search team (NEST) programmes. NESTs are specially trained units with responsibilities to track down and dismantle stolen nuclear weapons or material or to render harmless any radiological device. Future international discussions could include the training of and coordination between national NEST teams.

(c) Exercises and red teams. Operational practices — including the use of periodic exercises and red teams — have been developed by most nuclear States to evaluate their nuclear security and to improve the reliability of their existing system. The IAEA has recommended the use of red teams to test security, but there are no mandatory requirements and, moreover, governments have not shared their experiences with such red teams nor conducted rigorous exercises to develop best operational practices.

(d) Independent nuclear security audits. All States have organizations responsible for providing security for nuclear weapons and material, but there are no requirements for independent audits of records and operational plans. This is important, since organizations have parochial interests and perspectives that could lead to coverups or inadequate learning from past errors or mistakes. Each government should create an independent agency with responsibility in this area, and the IAEA could encourage such developments.

5. GOVERNMENTS SHOULD PRODUCE AND SHARE CASE STUDY HISTORIES OF NUCLEAR SAFETY AND SECURITY INCIDENTS

No government has a perfect record when it comes to nuclear weapon and material security and safety. All should learn from such mistakes, but organizational learning must not stop there. Bismarck once said “only a fool learns from his mistakes; wise men learn from the mistakes of others.” It is in every government’s interests to share what it has learned from its experience in the past to prevent similar problems from occurring in any other State in the future.

Multilateral discussions of all past incidents in which nuclear weapons or material were stolen or attacked, or theft attempts were made, could produce better vicarious learning. Such discussions could also provide reassurance that appropriate steps have been taken by each State to minimize reoccurrence of particular dangers. These discussions would move beyond sharing of current intelligence on terrorist threats to include more detailed information on past terrorist threats and specific security incidents, and to improved techniques developed afterwards to reduce such dangers. Let me give two examples of the types of nuclear incident that should be shared internationally: the improper security tests at Oak Ridge, Tennessee, in 2003 and the security lapses in Pakistan that led to the A.Q. Khan nuclear smuggling network.

During the summer of 2003 the US Department of Energy Inspector General completed an inquiry at the Y-12 National Security Complex in Oak Ridge following a request by the site manager there. Concerns over the reliability of the protective force performance tests had arisen after the defending team had decisively protected the base against four test attacks, when a computer simulation had suggested that they would fail two of the four. The Inspection General uncovered evidence that two of the defending agents had viewed the computer simulations on the days before the attacks, allowing them to know the specific strategies of the aggressors. Furthermore, it was learned that controlled information like this had been shared with several teams over the past 20 years. As a result of this inquiry, managers at nuclear sites across the country were instructed to take steps to protect the integrity and realism of future tests and the National Nuclear Security Administration has changed policies so that the same contractor is not hired to plan and participate in protective force tests for individual sites. Have other nations similarly changed their exercise and test procedures? I know of no evidence that this is the case.

A second example is the serious lapse that occurred in Pakistan's physical security procedures at the Khan Research Laboratory (KRL) in the 1980s and 1990s. Pakistani authorities have suggested that they did have a senior security officer, from the Pakistan military, serving as an 'independent' nuclear watchdog at the KRL throughout this period, but there were no rules against such officers being hired by the organizations that they are guarding after retirement, and apparently this happened in Pakistan regularly, leading the officers to be co-opted and not report on violations of security procedures and export policies by A.Q. Kahn and others at the KRL. Do all nations have rules preventing nuclear security personnel from being employed by the organizations that they are watching after retirement? I know of no evidence that this is the case.

6. THE 'INSIDER THREAT' PROBLEM

This leads to a final observation: the need to take the insider threat problem more seriously. There is a natural, but unfortunate, tendency in all elite security organizations to view terrorists as 'outsiders', foreign enemies seeking to harm our society. Yet, incidents of insider theft, sabotage or terrorist support have been witnessed in the security establishments of virtually all nuclear weapon States and many States with sensitive nuclear material. Such insider incidents are rare, but they are not non-existent.

Sabotage incidents by disgruntled workers were reported at some US nuclear facilities in the early 1990s, and concerns about recruitment of nuclear security guards by radical Rocky Mountain militia organizations emerged later in the decade. Many reported incidents of nuclear theft have been traced to insiders within the Russian nuclear establishment since the end of the Cold War. The arrest of two scientists from the Pakistani nuclear programme for their ties to Al-Qaida in the autumn of 2001 attests to the existence of insider threats in elite security organizations in South Asia. It is highly unlikely that any government is entirely immune from this problem.

The insider threat problem is a difficult one to deal with inside nuclear security organizations that pride themselves on their high degree of professionalism and loyalty. Yet it will continue to be a vexing problem, especially as incentives grow to add more and more security guards and other forces in efforts to enhance the physical security of nuclear sites. An awareness of the insider threat problem should influence policy decisions concerning DBTs (which should include insiders), PRPs and guard force recruitment, and monitoring and training at nuclear facilities in all of our countries.

In short, the threat of global terrorism requires a truly global and cooperative response. Governments must learn from their own successes and failures, but also from those of other States. We are all hostages to each other in this arena, and thus a failure by one is a failure for all.

DISCUSSION

I.A.H. NETO (Brazil): Often, when a developing country expresses an interest in acquiring a uranium enrichment capability, the question of its motives is raised and the argument that there is no economic justification for its acquiring such a capability is put forward. It is said that the country should rely on the international enrichment market for the nuclear fuel which it will need. What is Mr. Guerreiro's opinion regarding this issue?

A. GUERREIRO (Brazil): I have recently participated in the work of a group — convened by the IAEA Director General — on multilateral approaches to the nuclear fuel cycle, and in the group's report there is a statement to the effect that, while there may be no economic justification in the short term for acquiring a uranium enrichment capability, there may be an economic justification in the long term.

One simply cannot predict what is going to happen in many years' time, when what now seems to be a questionable action may prove to have been justified. In Brazil, for example, there was a big controversy about 50 years ago regarding the establishment of a State controlled oil company. Ultimately, Petrobras was established, with the State owning 51% of its shares, and thanks to its operations Brazil is almost self-sufficient in oil. I hate to think what Brazil's trade balance would be like if Petrobras had not been established.

In my opinion, when considering the acquisition of a uranium enrichment capability one should adopt a long term approach. Moreover, possessing nuclear fuel cycle technology can produce spin-offs of value in other areas.

R. GOTTEMOELLER (United States of America): Mr. Guerreiro made a very good case for the use of various technologies by developing countries — by all countries in fact — in furthering their development.

However, countries sometimes leapfrog a technology and adopt a newer one that is more effective — as many developing countries have done in embracing mobile phone networks rather than landline networks. The current nuclear fuel cycle technology is a 60 year old technology with significant problems, including that of the link between peaceful and military uses. Perhaps more emphasis should be placed on developing new nuclear fuel cycle technologies not associated with more problems.

A. GUERREIRO (Brazil): In my view, rather than restricting the spread of nuclear technology, we should ensure that the nuclear safeguards system is as effective as possible, giving a maximum degree of assurance that all countries are complying with their safeguards obligations.

S.B. ABDEL-HAMID (Egypt): In order to strengthen their nuclear security, developing countries need to acquire certain technologies, but restrictions are being placed on the necessary technology transfer. What can be done about that?

S.D. SAGAN (USA): The US Government is considering how other countries can be helped in the nuclear security area, through technology transfer and the provision of training. However, some people put what is in my view an excessively restrictive interpretation on NPT Article I, which states that each nuclear weapon State Party to the NPT undertakes — inter alia — "not in any way to assist, encourage, or induce any non-nuclear-weapon State to manufacture or otherwise acquire nuclear weapons or other nuclear explosive devices, or control over such weapons or explosive devices." They argue that helping non-nuclear-weapon States in the nuclear security area would run counter to NPT Article I. I should like to see the IAEA promoting a less restrictive interpretation of that article.

While I have the floor, I should like to say a few words about 'best practices', to which reference is frequently made in discussions regarding nuclear security. People seem to use the expression as if there were certain perfect practices whose adoption will solve all problems. In the nuclear security area, however, there are constantly new threats emerging, so that countries should constantly be thinking about how to make the best practices still better. In my view, the IAEA could play a useful role in that connection.

T. RIGO (Indonesia): In my view, non-nuclear-weapon States wishing to embark on nuclear power programmes should be assisted in doing so if they are complying fully with their NPT obligations and have placed all their nuclear activities under strengthened IAEA safeguards. The international community should think more in terms of 'carrots', with rewards for compliance, than in terms of 'sticks', prompted by horrifying threat scenarios.

S.B. ELEGBA (Nigeria): I believe that such States should be encouraged to pursue their peaceful nuclear ambitions in a transparent manner and within the letter and spirit of the NPT and that — in line with what was said by Senator Nunn — the Nuclear Suppliers Group (NSG) should ensure that such States can obtain the necessary nuclear fuel on economically reasonable terms, so that they do not have to develop a nuclear fuel production capability of their own.

C.R. STOIBER (USA): In the nuclear security area, reference is frequently made to 'the insider threat' associated with phenomena such as collusion, corruption and conflicts of interest. In my view, private companies generating nuclear power are probably in a better position to assess and counter the insider threat than governments. At conferences like this one, however, there are very few representatives of such companies. I should like to see something done to bridge the gap in the nuclear security area between the governmental culture and the private industry culture.

S.D. SAGAN (USA): I think the IAEA could make a start by diversifying the participation in such conferences through the inclusion not only of more representatives of private companies generating nuclear power but also of people like criminologists and experts in the workings of terrorist organizations.

In this connection, I believe that what are sometimes narrow mindsets in the nuclear security area could perhaps be broadened through independent peer reviews along the lines of those carried out in the nuclear safety area.

S.C. RAMUSHU (South Africa): My country, which is a member of the NSG, is having problems with the NSG guidelines when nuclear security considerations have to be borne in mind.

S.D. SAGAN (USA): That is understandable — the question has arisen as to whether there are tensions between one guideline and another. This is an area where the IAEA could perhaps help.

A. NILSSON (IAEA): I see the issue as one of developing a common basis on which States could control their exports of nuclear technology in the light of nuclear security considerations. The IAEA may be able to assist in the development of such a common basis.

E.S. LYMAN (USA): In his presentation, Mr. Amano said that Japan was complying with the requirements of the IAEA's INFCIRC/225/Rev.4 (Corrected) — The Physical Protection of Nuclear Material and Nuclear Facilities. However, that document was published before 11 September 2001, and some of its requirements should perhaps be reviewed. For example, it does not require that the persons guarding Category I nuclear material be armed.

At the Japanese facilities where large quantities of nuclear material are stored, are the security guards armed, and does Mr. Amano think that INFCIRC/225/Rev.4 (Corrected) should be reviewed in the light of the events of 11 September 2001?

Y. AMANO (Japan): Immediately after 11 September 2001 the Japanese Government, which is preparing to amend our relevant domestic laws, took a number of measures aimed at strengthening nuclear security in Japan. They included the introduction, at nuclear facilities, of around the clock patrols by special police and coastguard personnel, the intensification of cooperation with the national security agencies and the Ministry of Land Infrastructure and Transport, and the issuing of instructions to nuclear utilities that they restrict access to their facilities, tighten up checks on people entering and leaving those facilities, strengthen the monitoring of the areas around those facilities and organize their own patrols on a voluntary basis.

PERSPECTIVES ON GLOBAL NUCLEAR SECURITY: ACHIEVEMENTS AND LESSONS LEARNED

(Session 2)

Chairperson

W. RENNEBERG
Germany

PERSPECTIVE ON GLOBAL NUCLEAR SECURITY: G8 GLOBAL PARTNERSHIP

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1. INTRODUCTION

The importance, and urgency, of the international community taking action to forestall the proliferation of nuclear material has already emerged as a key theme of this conference. Senator Nunn's questions are extremely pertinent, although, at the same time, we are not starting from zero. This session looks at what some existing initiatives are already achieving, so that we can set out our new work on nuclear security in a broader context. In identifying new work we can avoid duplication, and in learning from experience to date we can improve our performance in the future.

2. WHAT THE PARTNERSHIP IS

In June 2002 the leaders of the G8 nations, meeting in Kananaskis, Canada, against the background of the attacks of 11 September 2001, committed themselves to preventing terrorists, or those who harbour them, from acquiring or developing chemical, biological, radiological and nuclear (CBRN) weapons, missiles, and related material, equipment and technology. They announced a series of non-proliferation principles, and an initiative to implement them, specifically a new global partnership against the spread of weapons and material of mass destruction, under which they undertook to implement a specific programme of cooperation, initially in the Russian Federation, to address non-proliferation, disarmament, counterterrorism and nuclear safety. The priority concerns that they identified were, and are, the destruction of chemical weapons, the dismantlement of decommissioned nuclear submarines, the disposition of fissile material and the employment of former weapons scientists. The G8 heads committed to raise up to $20 billion to support such projects over the next ten years, and they adopted a set of guidelines to form the basis for the negotiation of specific agreements with the Russian Federation and other countries for projects under the partnership.

They made clear that they would welcome both other contributors to the partnership and other recipients, providing that such countries were prepared to adopt the same common principles of non-proliferation and the same guidelines for the implementation of projects under the partnership.

The six principles underlying this approach remain as valid now as then, and we might just recall, in summary form, what they are:

— To promote the adoption, universalization, full implementation and, where necessary, strengthening of the multilateral treaty regime on non-proliferation, and to strengthen the institutions designed to implement these different instruments.
— To develop and maintain effective measures to account for and secure nuclear material, both while it is being produced, while it is in use and while it is being transported.
— To develop and maintain effective physical protection measures for facilities housing CBRN materials.
— To develop and maintain effective border controls, law enforcement efforts and international cooperation to detect, deter and interdict illicit trafficking in CBRN materials.
— To develop and maintain effective national export and trans-shipment controls, whether the items in question are or are not on the multilateral export control lists.
— To adopt and strengthen efforts to manage and dispose of stocks of fissile material no longer required for defence purposes, to eliminate all chemical weapons and to minimize holdings of dangerous biological pathogens and toxins, based on the recognition that the threat of terrorist acquisition is reduced as the overall quantity of such items is reduced.

Each one of these principles bears pretty directly on the issue of nuclear security.

3. IMPLEMENTATION

So what has happened since then? Inevitably, the first year was largely taken up with negotiating with the Russian Federation the terms under which projects would be implemented, based around the guidelines adopted at the summit, in a way also consistent with Russian law. That achieved, we could push ahead with implementation; this is now happening. Broadly speaking, work has centred around four principal lines of activity:

— The dismantling of nuclear submarines;
— The safe and secure storage of over 20 000 spent nuclear fuel assemblies;
— Creating new employment opportunities for former nuclear scientists and engineers, including in the closed cities;
— Contributing to the international effort required under the Chemical Weapons Convention to destroy 40 000 tonnes of Russian chemical weapons in a safe and environmentally sound way.

At the same time:

— The partnership has expanded to include new members: Australia, Belgium, the Czech Republic, Denmark, Finland, Ireland, the Netherlands, New Zealand, Norway, Poland, the Republic of Korea, Sweden, Switzerland and Ukraine.
— Countries have developed new and innovative ways to work together; for example, if I might speak of my own country, while implementing projects on our own account, we have also agreed with Canada, the Czech Republic, the European Union, New Zealand and Norway to implement projects for which they have provided the funding, since we already have a framework in place, for example for the construction of a chemical weapons destruction facility at Shchuch'ye.
— At the Sea Island summit last year, the G8 leaders identified additional proliferation challenges, such as the retraining of Iraqi and Libyan weapons scientists, eliminating the use of high enriched uranium fuel in research reactors worldwide, securing and removing fresh and spent high enriched fuel, controlling and securing radiation sources, strengthening export control and border security, and reinforcing biosecurity.

Not least in the interests of time, I hope my colleagues in the partnership will forgive me for sparing you a detailed account of the projects that each country is undertaking, but it might be worth while just trying to give a snapshot of progress to date on the four main areas of work, and the scale of the outstanding challenges:

— First, submarine dismantlement in the north-western Russian Federation. Of the roughly 250 nuclear submarines built by the Soviet Union, 193 have now been taken out of service; these include 117 from the Northern Fleet in the north-western Russian Federation, 57 of which still need to be dismantled. More than half of the remaining submarines still have spent nuclear fuel on board, which obviously represents a major environmental as well as security threat. A number of countries, including Canada, Germany, Japan, the United Kingdom and the United States of America, are involved in this dismantlement programme.

— However, we need also a holistic approach, which addresses the totality of the problem. The break-up of the Soviet Union left in its wake nuclear and other radioactive material spread across the Russian Federation and other former Soviet Union (FSU) countries; however, a physical protection system for nuclear weapons and material designed for a single State with a closed society, closed borders and well paid, well cared for nuclear workers has had to cope with a very different situation following the break-up of the FSU. Hence the importance of a programme to ensure that sensitive materials are protected to international standards from theft and sabotage. Programmes are in train to increase nuclear safety through the provision of technical improvements, training, and transfer of expertise and equipment, and to improve nuclear material accountancy, in order to reduce the risk that nuclear material could be lost or otherwise removed without detection.

— Similarly with the work on the spent nuclear fuel from the submarines. We need to address all stages of the cycle, from the cradle to the grave. It is not much good protecting the spent nuclear fuel on a decommissioned submarine if you then have nowhere to store it once you get it on land. Work is therefore in hand, for example on an interim fuel storage facility in Murmansk, in which the fuel extracted can be stored in special casks under safe and secure conditions. The Northern Dimension Environmental Partnership has a nuclear programme dedicated to dealing with the radioactive waste and spent nuclear fuel arising from the operation and decommissioning of the former Soviet Northern Fleet.

— I should also mention briefly the important work to decommission the fast breeder reactor at Anktau and the ongoing work to construct an effective long term shelter at the Chernobyl nuclear power plant in Ukraine. Discussions continue on the implementation of a programme to dispose of the Russian Federation's excess holdings of plutonium, implementation of which remains unresolved because of continuing disputes over the liability framework. This is clearly an important area in which progress needs to be made.

In other areas of the partnership work is going forward to help in eliminating, in the shortest practicable time, the Russian Federation's declared stockpile of modern chemical warfare agents, contained in over four million artillery, rocket and air delivered munitions. As a State Party to the Chemical Weapons Convention, the Russian Federation needs to complete the destruction of its chemical weapons stockpile by 2012. To meet this goal, it has sought substantial international help to build the facilities necessary for the destruction programme. Work is now under way on the construction of such destruction facilities at a number of sites throughout the Russian Federation, including Shchuch'ye, Kambarka, Kizner, Maradykovskiy and Pochep.

The fourth key area I mentioned is the redirection of former weapons scientists. Some 35 000 jobs are to be lost from the reorganization of the nuclear weapons complex in the Russian Federation by 2010, as the Russian Government implements restructuring plans for its ten closed nuclear cities; a similar process is likely to take place in many of the nuclear research institutes in the newly independent republics. A programme is under way to facilitate lasting alternative employment in the civil sector for these former nuclear weapons scientists, engineers and technicians, and to support the long term economic viability of the closed nuclear cities. The establishment of science and technology centres in the Russian Federation and Ukraine is one example of how work on this front is being taken forward.

All this has involved a substantial amount of work, by both donors and recipients. Legal frameworks have had to be established to allow project work to start. Project management infrastructure has had to be put in place, and working relationships between donors and recipients established in what is understandably a very sensitive area. Implementation has had to be got under way, in often challenging physical conditions. All this has happened.

In the process, we have learnt some useful lessons, in particular that:

— Our best hope of combating the terrorist threat is through cooperation and collaboration.
— Doing what we are doing now, networking, getting to know each other better, sharing experiences, best practice, etc., is absolutely vital and should be enhanced if we are to reduce duplication of efforts, improve prioritization and build on the acknowledged successes of the partnership and help create a safer world.
— Establishing good, effective international coordination is a long term education process but essential for progress.
— Enhanced, standardized and regular reporting of projects is an important tool in the communication process.
— Greater transparency is needed to avoid bureaucratic delays and misunderstanding.
— Good, experienced project management is essential.
— Projects are often interdependent, and some cannot proceed until others have been completed. Donors need to ensure that they honour their pledge commitments. It is important to complete projects to time and cost if more funding is to be achieved.

— Strengthened collaboration and coordination has reduced the technical and financial risks for all involved and helped to ensure that the considerable amounts of taxpayers' money from national governments is being well spent.

4. FUTURE PROSPECTS

As I say, this is a ten year programme, at least, but much progress has already been achieved. Firm foundations have been laid, on which we need to build quickly. Implementation is now the priority. We must maintain the momentum established, and implement the projects identified, hence the theme of work under the UK's presidency this year: 'pledges to progress'. Nonetheless, as we would see it, the global partnership is already putting into practice the main messages of this conference. It is proving an excellent example of the international community working together to draw a line under the past, to secure the future. Enhanced cooperation within and between G8 governments, and their outreach to others, has been key to progress so far, and will remain so.

Nonetheless, at the same time we should not be closed to new or rising challenges and threats, for example the security of fissile and radioactive material, where, arguably, more work needs to be done, in close cooperation with the Russian authorities, to deal with the security of nuclear and high activity radioactive sources. Which is, of course, the key focus for our conference this week.

Three years on from the Kananaskis commitment, therefore, we as presidency think it timely to review progress, to ensure that the current focus of the partnership is right and to check whether there is any need for reprioritization. This conference will be an important input to that process.

PREVENTING NUCLEAR TERRORISM: TOWARDS AN INTEGRATIVE APPROACH

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1. INTRODUCTION

Today, the threat of nuclear terrorism is at the centre of the United States' and the international security agenda. It was not always so. Only after the 11 September 2001 terrorist attacks and subsequent attacks around the world has the international community mobilized to confront the spectre of terrorists armed with weapons of mass destruction (WMD).

We can all take pride in the important work and steps taken to address nuclear terrorism in the four years since 11 September 2001. Progress is under way to improve the security of nuclear and radioactive material, to update antiterror norms and controls over nuclear technologies, and to heighten awareness of the dangers arising from nuclear terrorism, thanks in part to conferences like this.

As impressive as these gains may be, far more remains to be done to keep nuclear and radiological weapons out of the hands of terrorists and the States that sponsor them. A useful step forward would be to move towards an integrated strategy that joins more conventional antinuclear-terror activities (i.e. securing nuclear and radioactive assets against theft and sabotage) with efforts to strengthen the core of the non-proliferation regime (i.e. safeguards, physical protection, export controls and strengthened treaty regimes) to prevent terrorist acquisition or brokering of WMD technologies. Prevention of nuclear terrorism and traditional non-proliferation programmes form two halves of the same walnut; we cannot treat them as separate enterprises.

2. SOVEREIGN RESPONSIBILITY: A STARTING POINT

The fight against nuclear terrorism must involve all States. Opportunities for terrorists and their supporters to access weapons capabilities are expanding beyond national borders, as illustrated by the A.Q. Khan network and its ability to manufacture components off-shore and move weapons related technology to clandestine end users.

This panel is to address lessons for the future. The first one is that, as a matter of principle, unless all States accept sovereign responsibility over activities under their jurisdiction and control, whether that is trade and border controls or regulation of nuclear material or nuclear facilities in conformance with international regimes, we risk some future, catastrophic act of nuclear terror. This is a future that we have a collective responsibility to avoid.

3. THE PRESIDENT'S NON-PROLIFERATION INITIATIVES

An approach that rests on the principle of sovereign responsibility will work best when non-proliferation regimes are strong. Regrettably, the patchwork of treaties, arrangements and State obligations that forms the non-proliferation regime is facing serious challenges.

Last February, President Bush highlighted nuclear proliferation dangers and called on the international community to "translate into action" the consensus that proliferation cannot be tolerated and must be stopped. Let me group the President's proposals into four imperatives and comment briefly on each.

Firstly, efforts to secure high risk material must be expanded. This is an important area of work for the USA and our G8 and other partners. Cooperation with the Russian Federation, given its vast stores of weapons suitable material, is naturally a first order priority. Our strategy to ensure the security of weapons material has five core elements:

(a) Stopping the further production of fissile material usable in weapons.
(b) Consolidating high risk material and repatriating fresh and spent high enriched uranium (HEU) from research reactors.
(c) Protecting vulnerable nuclear and radioactive material by accelerating security upgrades and deploying radiation detection systems at strategic transit points worldwide.
(d) Eliminating excess weapons grade plutonium, continuing to downblend excess HEU for commercial power and, to the extent possible, ending the use of HEU in civil nuclear applications.
(e) Ensuring that sustainable national nuclear regulatory programmes are in place to keep nuclear material and facilities under proper control.

This cooperation has yielded tremendous progress in recent years, protecting or eliminating fissile material equivalent to many hundreds of nuclear weapons.

Newer initiatives like the US Global Threat Reduction Initiative are moving forward to build international support for national efforts to identify, secure, recover and facilitate the disposition of nuclear and radioactive material of possible interest to terrorists. Since last September, this initiative has repatriated fresh HEU fuel from Uzbekistan and the Czech Republic to the Russian Federation, initiated regional training programmes and initiated more than ten other joint projects.

As the two largest nuclear States, a special burden falls on the USA and the Russian Federation to keep nuclear and radioactive material out of the hands of terrorists. Cooperation with the Russian Federation on nuclear security will remain a priority for the USA. Cooperative programmes have wide support, are well funded and are a regular discussion item between the US and Russian Governments, as was indicated by the recent Joint Statement on Nuclear Security Cooperation at the Bush–Putin meeting in Bratislava. An important and growing element of our cooperation is to exchange best practices, first with one another and subsequently with all States and with the IAEA. No matter how good a security system is, there is always something to learn in exchanges with other professionals.

The USA is not advocating measures for others that it is unwilling to accept for itself. We are tightening regulatory controls and have dramatically improved our internal security posture. We have installed additional protective barriers external to facilities and upgraded existing barriers for increased strengthening. Our perimeter alarm systems have been enhanced to counter the increased threat, and we have strengthened security to protect sensitive shipments. Facility access controls for employees and visitors to our facilities have been upgraded, and we have enhanced our protective forces training to focus on tactical training to oppose terrorists. We take this threat very seriously.

Secondly, States must scrupulously comply with international non-proliferation undertakings, whether under the Treaty on the Non-proliferation of Nuclear Weapons (NPT), IAEA safeguards, international nuclear and radiological conventions or the new United Nations Security Council Resolution 1540.

The NPT requires that all States complete a safeguards agreement with the IAEA, yet more than 30 Treaty States have yet to do so. Many fewer States have signed, much less ratified, the Additional Protocol to IAEA safeguards or have the infrastructure to control exports or monitor borders for illicit, WMD related trade. This lucrative opportunity to potential proliferators must be eliminated. I am proud of the leadership my government has shown in signing and ratifying the Additional Protocol, which, as the President has recommended, must become a new universal standard for non-proliferation.

Knowing what we now know about the sophistication of the nuclear black market, if trade controls fail then countering proliferation through the interdiction of trade is clearly needed. This is the purpose of the Proliferation Security Initiative (PSI), launched by the USA and others in 2003 to promote interdiction principles, share information and conduct operational exercises. Resolution 1540 and the PSI come together in an important respect: in order for interdiction to succeed, States must have the legal basis and means both to identify and hold seized trade.

The global reach of the A.Q. Khan network was telling in this regard. Consider the report of the Malaysian Inspector-General of Police concerning the involvement of a Malaysian company in the Libyan nuclear procurement ring. According to this report, nuclear specialists within Malaysia were unable to identify controlled components as those that might contribute to Libya's uranium enrichment programme. This experience has been repeated in other countries, and suggests that unless States take seriously their domestic responsibilities to control activities under their jurisdiction, the gaps exploited by the Khan network will continue to be open to tomorrow's proliferators and terrorists.

In addition to greater vigilance by States, targeted and coordinated programmes of assistance are also needed. The USA promotes cooperative exchange programmes on export control, border security and physical protection to redress these implementation gaps. The programmes have expanded in recent years to include more than 50 countries in every major region of the world.

The international community must also consider how it can respond to States that take the responsible course of abandoning WMD. The USA recently expanded efforts to redirect former Soviet weapons scientists towards peaceful commercial employment to also include Libyan and Iraqi scientists. These efforts are needed to prevent leakage of WMD know-how, but they also aid States that have turned away from the pursuit of WMD to build their economies and science and technology base.

More could be done to improve coordination of international outreach programmes, including use of the IAEA and the Organization for the Prohibition of Chemical Weapons (OPCW) to inform members of the requirements of Resolution 1540 and to facilitate training activities or elaborate codes of conduct and best practice for industry and nuclear users.

Thirdly, the integrity of the NPT and IAEA safeguards must be preserved, especially in regions linked to terrorism, religious extremism and long histories of armed conflict. Although the articles of the NPT and the original IAEA safeguards agreement were drawn up years ago, they remain relevant in today's world. Our goal must be to ensure that these arrangements are strengthened, complied with and fully enforced.

Some argue that proliferation in North Korea, Iran and, before it recanted, Libya, tells the troubling story of an NPT too outdated or weakened to blunt nuclear proliferation. The USA believes that this critique is misplaced. Non-proliferation institutions express the will of their members. If we are dissatisfied with regime performance, then the burden falls on us, the peaceful, cooperative governments, to correct deficiencies and demand redress, including earlier intervention by the United Nations Security Council, from those who violate their treaty and international safeguards obligations.

To brace IAEA safeguards, President Bush has called for the creation of a special IAEA verification committee to monitor and enforce compliance with nuclear non-proliferation obligations. Terms of reference for this committee are now under consideration by the IAEA Board of Governors. We look forward to examining ways in which IAEA verification authorities can be improved or even expanded. Equally encouraging is the creation of new units within the IAEA to review commercial satellite imagery and monitor foreign procurements. To the extent that these new capabilities provide the IAEA with earlier warnings of evasive activities, they should be a welcome addition to IAEA safeguards and our common non-proliferation and antinuclear-terror goals.

For safeguards and global security measures to be fully effective, we need full implementation of new instruments that address nuclear terror. The USA was a strong proponent of efforts last year to complete new export–import guidance for the IAEA Code of Conduct on the Safety and Security of Radioactive Sources. Implementation of this guidance is essential for controlling beneficial civilian devices when exported from one country to another and for preventing their theft or use in malicious acts such as detonation of a dirty bomb. This year, we hope for similar success in updating the Convention on the Physical Protection of Nuclear Material. The Code of Conduct and the Convention are integral parts in the prevention of nuclear and radiological terrorism, and we will work with others to ensure that these instruments are universally applied.

President Bush and the other G8 leaders urged all States to implement the revised Code of Conduct and recognize it as a global standard at the Sea Island summit last year. We call upon all Member States to apply the revised Code of Conduct to prevent diversion of sources and acts of radiological terrorism.

Fourthly, the proliferation of enrichment and reprocessing technology must be stopped. While terrorist acquisition of an enrichment plant is a low risk, the continuing spread of sensitive nuclear technologies can only create greater opportunities for sub-State actors to acquire weapons material. Libya, Iran and North Korea all to one degree or another benefited from the illicit acquisition of enrichment or reprocessing technologies. Unfortunately, the right in the NPT to peaceful nuclear cooperation (Article IV) makes no distinction between sensitive fuel cycle and other nuclear technologies.

Recognizing this risk, President Bush last year proposed that supplier nations refrain from transferring enrichment and reprocessing technologies to States that do not already possess full scale, functioning enrichment and reprocessing plants. The Nuclear Suppliers Group and G8 nations continue to examine this proposal, as well as others that would establish solid eligibility criteria for receipt of such transfers and make the Additional Protocol a new condition of peaceful nuclear trade.

4. CONCLUSION

At the opening of the nuclear age, Albert Einstein warned that the advent of nuclear fission had changed everything except the way we think, and thus we drift towards disaster. Einstein's world of one or two masters of nuclear technology was far different from the one we live in today, in which nuclear science and material are widely spread, but the risk of disaster remains. Nuclear security in today's age of terrorism requires global participation, not just by national governments but also by police forces, border guards, cities, communities, harbours, research institutes and factories.

With a concerted and action oriented approach to combat nuclear proliferation threats, one that involves the cooperation and input of nations and respect for international agreements, norms and standards, the USA is convinced that the consensus against proliferation will, as President Bush suggested, be "translated into action".

MEASURES THAT THE FEDERAL ATOMIC ENERGY AGENCY OF THE RUSSIAN FEDERATION IS TAKING TO IMPROVE PHYSICAL PROTECTION

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In our view, this conference is a logical extension of international efforts to coordinate activities to prevent potential acts of nuclear terrorism. Terrorism, in all its manifestations and in scale, has become one of the most dangerous problems of the 21st century. Our experience tells us that the possibility now exists for nuclear material to be used for criminal purposes. This is the starting point for us in the Russian Federation. In the light of this and the rapid development of nuclear power for peaceful purposes, the physical security of nuclear sites is one, if not the most crucial, factor in determining the long term prospects for nuclear development and for international collaboration in this field.

Against this background, the IAEA's role in strengthening the international physical protection regime for facilities involved in the peaceful use of atomic energy is steadily growing. Nowadays, this activity has a pronounced preventive dimension focused on potential acts of nuclear terrorism.

Rosatom (which I represent) carries out its activities in the field of the physical protection of nuclear material and facilities in accordance with the fundamentals of the Russian Federation's national nuclear and radiation safety policy for the period up to 2010 and on the basis of the Rosatom sector based programme for improving the physical protection of nuclear material, nuclear facilities and nuclear material storage locations.

The main focus of our efforts to strengthen the physical protection regime is directed at improving the security system for nuclear facilities and nuclear material. In the Russian Federation, all facilities that pose a nuclear threat are under the protection of the federal domestic security forces. Also, departmental security units have been set up to assist the domestic security forces in security and emergency response matters. A federal State enterprise, Rosatom Departmental Security, has been created, and its function is to direct the activities of the on-site units. Professional training for the departmental security staff is carried out in accordance with a Ministry of Internal Affairs approved programme for the professional training of departmental security employees.

International exchange of experience in the organization of security is valuable. Our cooperation experience with the United States of America has, in particular, been extremely useful for both sides.

An important part of our activities is the development and introduction of advanced technical systems for physical protection. Besides the development and improvement of conventional technical approaches to physical protection, we are working on developing and introducing:

— Rapidly deployable technical systems for protection during specialized transport temporary halts and for local areas during emergencies;
— Systems and resources for alarming water and underwater sections of a perimeter;
— Physical protection system analysis methods and specialized software.

To address effectively the problems associated with protecting nuclear facilities from the air, it would be useful to familiarize ourselves with international approaches to this complex task. With a view to an integrated solution to protection of the country's major facilities, a Russian Federation Safety Council initiative is debating the establishment of an advanced technology centre, which would bring together specialized companies that fall under the jurisdiction of various ministries, departments and organizations.

Rosatom is paying particular attention to ensuring effective security during the transport of nuclear materials and products based on them. The main reason for doing so is because shipments of radioactive material are the most vulnerable element of the atomic energy utilization process cycle, as it is impossible to establish a secure area around a means of transport — because of the limited number of security guards accompanying a transport, because the whereabouts of the transport cannot be determined for large parts of transport routes and because of the large distance between response force stations and places where incidents (acts of sabotage, accidents, etc.) might occur.

Thus, ensuring a high level of safety requires not only effective application (development) of the necessary engineering and technical resources but also timely and appropriate action by the staff escorting consignments, and/or by response forces, and this can only be achieved through the development of an automated safety system. A system to ensure the safety of transport of nuclear material has been under development since 1998.

As a result of joint efforts, an automated transport safety system has been devised. The work to develop this system has been approved by the

Government of the Russian Federation. The automated transport safety system enables continuous monitoring of a means of transport wherever its location, reliable detection of any attempt by intruders to penetrate a means of transport and, with the help of satellite systems, prompt transmission of information about emergencies to dispatcher points in real time for timely emergency response by security forces and emergency and rescue squads.

In September 2003 command and staff exercises, to which US specialists were invited, were conducted in Sarov to test the automated transport safety system. The Russian and US specialists rated the exercises as a success; the automated transport safety system operated reliably, demonstrated its viability and ensured timely transmission of the alarm signal. The physical barriers of the automated transport safety system held the intruders back long enough for the response forces to be deployed and reach the scene.

Physical protection systems cannot function properly without qualified staff. Physical protection training and refresher courses for Russian and foreign specialists, including departmental security managers and staff, are held at Rosatom's interdepartmental special training centre (Obninsk). In addition, there is a physical protection faculty at the Moscow Engineering Physics Institute. Sector specific training establishments have been identified and form the basis for regional training centres providing training for a number of categories of departmental security staff: the Siberian advanced training centre (Novosibirsk) and the Urals advanced training centre (Novoural'sk).

With IAEA support, the aforementioned Rosatom centre has conducted five international courses on physical protection. Since 2001 specialists, including managers, from 17 countries have received training on these courses. In our view, such courses should become routine.

A laboratory for training in the use of technical physical protection resources manufactured abroad is currently being set up at this centre (with IAEA assistance). We hope that there will be further fruitful collaboration with the IAEA.

Collaboration between the federal executive authorities plays an important role in organizing the protection of nuclear facilities. This is because of the need to:

— Develop and approve regulatory acts on physical protection matters;
— Organize and coordinate physical protection activities;
— Supervise the organization and status of physical protection at facilities posing a nuclear hazard that fall under the jurisdiction of different departments;
— Carry out the Russian Federation's obligations within the framework of international cooperation.

Regulations regarding collaboration on physical protection systems have been developed and approved in conjunction with the Russian Ministry of Internal Affairs and the Russian Ministry of Defence Directorate for State Supervision of Nuclear and Radiation Safety.

In cooperation with the Russian Ministry of Internal Affairs' domestic security forces, and with territorial safety and internal affairs authorities, work is under way to check the security status of facilities and controlled areas, joint training in physical protection tasks is being conducted, additional measures are being taken to strengthen the access regime and to upgrade security for special consignments during shipment, and training in joint inspections for security forces has been introduced.

All of Rosatom's activities in the field of physical protection are under the constant supervision of the Russian Federation's inspection bodies. State supervision of physical protection is carried out by Rostekhnadzor (Federal Service for Environmental, Technological and Nuclear Supervision), and also by the Directorate for State Supervision of Nuclear and Radiation Safety at the Russian Federation's Ministry of Defence (the latter for companies in the nuclear weapons industry). Besides this, there is also departmental inspection in accordance with programmes approved by the aforementioned authorities.

Rosatom places a great deal of emphasis on international cooperation in the field of physical protection.

Rosatom fulfils the functions of the central State authority and point of contact in accordance with the provisions of the Convention on the Physical Protection of Nuclear Material (CPPNM) and the functions of the national competent body for fulfilling the Russian Federation's obligations to the IAEA in the field of physical protection.

Great importance is given to cooperation with the IAEA in the following areas:

— Participation in the elaboration of international documents in the field of physical protection;
— Exchange of information with the IAEA and States Parties to the CPPNM;
— Participation in the provision of advisory services to States Parties to the CPPNM, including in international missions of the IAEA's International Physical Protection Advisory Service (IPPAS);
— Participation in activities organized by the IAEA to train specialists in the field of physical protection.

We also participate in regular bilateral international cooperation with the USA and European Union countries on the improvement of physical protection.

At present, 21 facilities presenting a nuclear hazard are cooperating with regard to physical protection. These include such major enterprises as the Mayak production company and the Siberian Chemical Complex, which possess considerable quantities of nuclear material of various categories and include various types of nuclear facility.

It should be noted that Rosatom, which has considerable scientific, engineering and technical capability and many years of experience in the field of physical protection, is also prepared to offer assistance to other countries, particularly in training specialists in all areas of physical protection, including through holding various courses, seminars, lectures and consultations.

In addition, Rosatom is actively participating in measures to ensure the physical protection of sources of ionizing radiation in Georgia and other States of the Commonwealth of Independent States, and helps coordinate these activities.

We consider that the exchange of information in the field of physical protection is extremely important and that it can be of considerable practical benefit in view of the specific features and differences in approach to physical protection in various countries. We all have something to share with each other and to learn from each other.

A further important area of activity is improving the systems of accounting for and control of nuclear material. In this context, note should be taken of the successful implementation of the Trilateral Initiative of the Russian Federation, USA and IAEA, aimed at international collaboration in addressing the safety and security of radioactive substances and sources.

Also of great significance, in our view, is the Global Partnership Against the Spread of Weapons and Materials of Mass Destruction, launched in June 2002 in Canada by the leaders of the G8 countries.

Rosatom is actively supporting IAEA activities aimed at strengthening the international physical protection regime. The IAEA's role in today's fast changing world must, in our view, expand — primarily its role as guarantor of the equitable development of peaceful nuclear power.

Rosatom considers all forms of bilateral cooperation to date to be useful and thinks that they should be continued in the future, thereby helping to strengthen the international physical protection regime.

NUCLEAR SECURITY IN CHINA: STRENGTHENING INTERNATIONAL EFFORTS IN NUCLEAR SECURITY AND PROMOTING INTERNATIONAL COOPERATION

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Ever since the terrorist attacks of 11 September 2001, non-conventional security issues represented by transnational and transregional terrorist activities have been increasing. Some international terrorists or terrorist organizations turned to nuclear material and devices and began to seek access to nuclear explosive devices or radiological dispersal devices to attack the public. They tried to cause public panic or damage to the international community through sabotaging nuclear facilities and attacking nuclear material transport vehicles, which could bring serious nuclear destruction or radiological jeopardy. Nuclear terrorist activities have become one of the most worrisome forms of terrorism that the international community is facing. At present, when nuclear energy is widely used, the lack of effective ways to curb nuclear terrorist activities will not only damage the healthy development of the peaceful uses of nuclear energy but also put the peace and security of the international community at formidable risk.

Fortunately, the international community has attached great attention to international nuclear terrorist activities and adopted preventive measures. The United Nations Security Council adopted Resolutions 1373 and 1540, which called upon all States to take effective measures through strengthened legislation and to cooperate in preventing the illicit trafficking of nuclear weapons and related material. In the multilateral nuclear security arena, the IAEA has played an active role in strengthening international efforts in nuclear security and in improving the international non-proliferation regime through making work plans for the prevention of nuclear terrorism, initiating the amendment of the Convention on the Physical Protection of Nuclear Material, urging Member States to implement the Code of Conduct on the Safety and Security of Radioactive Sources and establishing the Nuclear Security Fund to help developing countries improve their nuclear security capabilities. The IAEA is now cooperating with related international organizations in inviting ministers and high level officers to gather in London to share views on the present situation of global nuclear security and its future prospects and to discuss possible cooperation. I am convinced that this conference will have a positive influence on the strengthening of the international nuclear security regime, and the preventing and curbing of nuclear terrorist activities.

China has always stood for the complete prohibition and thorough destruction of all kinds of weapons of mass destruction, including nuclear weapons, has resolutely opposed the proliferation of such weapons and has been against the theft and illegal transfer of nuclear material. China took a highly responsible attitude and actively participated in activities aimed at strengthening international non-proliferation efforts and nuclear security capabilities. Regulations and supervision systems on sensitive items and technologies have been set up in compliance with international regulations and practice.

As an approach to prevent the theft, damage to, loss, and illicit transfer and use of nuclear material, China issued the Regulations on the Control of Nuclear Materials and the guidance on their implementation in the 1980s, which made specific provisions on the licensing system, physical protection requirements, and accountancy and control of nuclear material. Based on them, the Accountancy and Control System for Nuclear Materials and Nuclear Material Security System were also set up. Pertinent departments of the Chinese Government issued in recent years the Rules on Inspection of Nuclear Materials Control, Rules on Physical Protection for International Nuclear Materials Transport, Regulations on Security of Nuclear Power Plants, Guide on Physical Protection of Nuclear Materials, and other technological documents, which place the control and physical protection of nuclear material on to an institutional and standard track.

The competent authorities in China have strengthened support for research and development and personnel training for physical protection technology. While ensuring compliance with the physical protection standards at the international level of such newly established nuclear facilities as large capacity nuclear power plants, old facilities with lower protection technology and standards have also been upgraded.

An interdepartment nuclear emergency coordination mechanism has been established by the Chinese Government and countermeasures are in place to respond to nuclear terrorist activities and other emergencies. Nuclear emergency preparation and practices in nuclear facilities have been reinforced and studies on antinuclear-terrorism have been actively carried out.

In order to exercise strict control on nuclear material, dual use items and related technologies, and to eliminate the threat of proliferation in export, the Chinese Government issued the Regulations on the Control of Nuclear Export and the Regulations on the Control of Nuclear Dual Use Items and Related

Technologies Export in 1997 and 1998, respectively, to ensure strict licensing management of the export of nuclear material and dual use items. The coding of items on the control list for the customs service is in process, which will facilitate effective control of the export of sensitive items.

As the application of nuclear technology increases, radioactive sources are increasingly used in agriculture, industry and medicine. The long life cycle, large quantity and broad distribution of such sources cause much difficulty in management. Related laws, regulations and management mechanisms will be established by the State to improve the comprehensiveness and effectiveness of radioactive source management. The competent authorities can then ensure strict management of radioactive sources throughout manufacturing, transport, usage and recycling to reduce the risk of loss or theft to the minimum.

The Chinese Government issued the Regulations on Radioactive Protection for Radiological Isotopes and Radiation Emitting Facilities, which provide for registration and licensing management for radioactive sources. The Law of the People's Republic of China on Radioactive Pollution Prevention and Control was issued in June 2003. The issuance of department level regulations such as Rules on Radioactive Sources Coding and Requirements on Radioactive Sources Import and Export Licensing paved the way for strengthened management of radioactive sources. Relevant departments made a joint special nationwide effort to check up on radioactive sources in May 2004 in order to further improve the management mechanism and assess the situation. A comprehensive examination was made of the use and management of radioactive sources, and a number of orphan radioactive sources were gathered. On the basis of the current 25 urban radioactive waste depositories, an overall plan for urban depositories in the whole country is being made to facilitate the storage of radioactive sources. The Chinese customs service is developing the necessary technology and tools of management to better supervise the import and export of radioactive sources.

With years of unswerving efforts, China has not only formulated the regulations and measures necessary for performing non-proliferation obligations and nuclear security duties, but has also established a control and supervision system with the participation of the government departments of nuclear energy, environmental protection, commerce, public security and customs. China's efforts at non-proliferation and nuclear security are improving steadily.

While improving continuously its domestic regulatory systems, China attaches great importance to international cooperation and exchange in nuclear non-proliferation and nuclear security, and actively supports the international community in strengthening efforts in the two fields.

China has signed all of the international treaties and conventions pertinent to nuclear non-proliferation, including the Treaty on the Non-proliferation of Nuclear Weapons and the Comprehensive Nuclear-Test-Ban Treaty, and has acceded to international non-proliferation regimes, including the Zangger Committee and the Nuclear Suppliers Group. The Additional Protocol to the Safeguards Agreement between China and the Agency came into effect in March 2002 and China performed the duty of notification accordingly. With effective domestic supervision and coordination, China has exchanged information timely with the IAEA and other countries. China has also given positive support to and participated in the non-proliferation activities of the United Nations and the IAEA such as the amendment of the Convention on the Physical Protection of Nuclear Material and the Code of Conduct on the Safety and Security of Radioactive Sources, and played a constructive role in the United Nations High Level Panel on Threats, Challenges and Change.

In terms of bilateral cooperation, China and the United States of America have held regular talks focusing on nuclear non-proliferation policies and have made a wide exchange of related technologies and detailed measures. The two sides have decided to hold a technology demonstration of physical protection of nuclear material in October this year in China. China has maintained regular talks with Canada and Japan concerning nuclear export control and safeguards. The Chinese Government has cooperated with relevant countries in container security and nuclear material inspection to ensure the security of China's ports.

The China Atomic Energy Authority set up this year a special fund purely for international cooperation in nuclear non-proliferation, to provide reliable resources for China to play a bigger role in international non-proliferation activities and to fulfil its obligations.

The fundamental objective of strengthening international nuclear security and non-proliferation is to keep global, regional and national peace and security, and to promote sustainable social and economic development, which are in the common interest of the international community and the responsibility of all nations. To achieve this goal, every nation should not only perform its due obligations in this regard but also actively participate in building international non-proliferation and nuclear security regimes, make joint efforts in combating nuclear proliferation and nuclear terrorist activities in all forms, and prevent any terrorist action that may jeopardize the health and safety of people.

Meanwhile, we should also be aware that the establishment and improvement of international non-proliferation and nuclear security regimes is a progressive process, and that policies and measures should be formulated on the basis of wide participation of nations and democratic decision making. Only in this way can they obtain understanding and support from most members of the international community, and can justice, rationality and impartiality be guaranteed.

Faced with a complicated and changeable international security situation, China, as a member of the international community, will, as always, participate in the various efforts of the international community in strengthening nuclear security, non-proliferation and antinuclear-terrorist activities, and make due contribution to achieving lasting peace and the common prosperity of the international community.

NUCLEAR SECURITY EXPERIENCE: THE CASE OF YEMEN WITHIN ITS REGION

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Abstract

The National Atomic Energy Commission (NATEC) of Yemen has been in existence only for the past five years, yet its achievements have been phenomenal. Apart from border control, nuclear and radiological security in Yemen is arguably among the best in the world. This paper highlights the challenges and achievements of Yemen within its region.

1. INTRODUCTION

1.1. Brief history of nuclear and radiological security in Yemen

Since Yemen has no nuclear material, nuclear security in Yemen means radiological security, apart from the issue of illicit trafficking of both nuclear and radiological material.

Prior to 1999 there was no infrastructure in Yemen either in radiation protection or in nuclear and radiological security. The intelligence authorities were responsible for such security matters. In 1999 a presidential decree was issued establishing the National Atomic Energy Commission (NATEC), which is responsible for nuclear and radiological security among other matters related to atomic energy. Since the establishment of NATEC, apart from border control Yemen today is arguably one of the leading countries as far as radiological security is concerned. This means that all of Yemen's radioactive sources are under strict control.

1.2. Yemen's 11 September

Yemen had its own war against terror in terms of enhancing its security systems in all fields, including the radiological field, but interestingly enough, as far as nuclear security is concerned, Yemen started before 11 September 2001, as NATEC's efforts in this regard started in 2000.

On 12 October 2000 in the Yemeni port of Aden the United States Navy destroyer USS Cole was attacked, and a number of security questions were raised, including those on radiological security. At this point NATEC began establishing Milestone Zero[1]. After less than a year the events of 11 September 2001 occurred, at which point Yemen began its integration into the international efforts.

On 6 October 2002 another disaster took place, similar to the attack on the USS Cole, in which a French oil tanker was attacked off the coast of Yemen — this was a message that nothing is invulnerable. NATEC's understanding since then is that every radiological source in any facility with whatever use should be registered, licensed, inspected and secured.

2. STATUS OF NUCLEAR SECURITY IN YEMEN

Before highlighting the achievements, we need to talk about the challenges facing NATEC in respect of nuclear and radiological security.

2.1. Challenges

Yemen's long coast is a security problem, especially for a developing country, although Yemen has been working on enhancing its maritime security since 2000. It recognizes the maritime threat and understands that the threat is not just in attacks on passing ships or oil tankers but also in their possible use as tools for smuggling nuclear and radioactive material, which is also an international issue.

Yemen recognizes the huge responsibility and the need for cooperation between countries. Yemen has been assisted by donor countries in launching its coastguard in all its requirements, from acquiring boats to providing training for the staff.

The next step is to integrate nuclear security with the coastguard, which means to arm and train the coastguard with handheld radiation monitors in order to integrate nuclear and radiological security into our maritime efforts. Here NATEC is only steps away from achieving this goal and is hoping to do so in cooperation with the IAEA and donor countries.

It should also be borne in mind that Yemen has long land borders, which NATEC is also planning to control. Yemen is participating and assisting in all international efforts that strengthen border controls, but this is a big challenge.

[1] This was prior to graduating from the Model Project Milestones 1 and 2.

The long land borders with Saudi Arabia and Oman need to be sealed in order to prevent illegal activities, including any possible illicit trafficking of nuclear or radiological material. NATEC hopes to do this in cooperation with its neighbours.

2.2. Accomplishments

Yemen so far has a small number of high risk radioactive sources, which are all under possibly the most strict regulatory control on Earth. In Yemen, all licensees must, among many things, adhere to the security group requirements in IAEA-TECDOC-1344 and IAEA-TECDOC-1355. In addition, the licensee must adhere to the national regulations, which require a security manager (officer) in every licensed facility who personally signs the licence application form and becomes accordingly liable (including possible imprisonment) for any breach of security under his or her jurisdiction. NATEC registers, authorizes, licenses and duly inspects all non-exempt radioactive material from the point it enters until it leaves the country. This is done by a radiological security department within NATEC, which is legally authorized, staffed and equipped.

Yemen has no capability for managing radioactive waste. No non-exempt radioactive material is allowed to stay in the country after the expiration date of its licence (unless renewed).

2.3. Code of Conduct on the Safety and Security of Radioactive Sources

Yemen has been one of the main sponsors and promoters of the Code. It has been among the leading parties working towards its promotion.

Yemen believes that implementing the Code globally will be beneficial for the whole international community. In fact, it sees the Code as the basis for further international development on the subject and it will fully continue to support it.

2.4. Nuclear security progress in the region

The region of West Asia and the Horn of Africa has made good progress in the past five to ten years; in fact, West Asia has had the best accomplishments within the IAEA Model Project for Radiation Protection Infrastructure, at least in establishing Milestones 1 and 2. This makes our region ready to establish a whole security programme, which will be good for the countries in the region.

However, more needs to be done in the region both in taking every radioactive source under regulatory control and making sure that the region's borders are secure. This latter point is a major challenge and a tougher problem, which needs efforts and assistance from all parties, especially the IAEA and donor countries.

Yemen has had the best achievements within the West Asia group, going from zero in 1999 to being a leader in the field of radiological safety and security today. This will make Yemen a centre of excellence for organizing and developing nuclear security aspects in the region.

3. CONCLUSION: LESSONS LEARNED AND PROPOSALS FOR THE FUTURE

Although achievements have been made, the question still remains: can radioactive sources fall into the wrong hands? The answer is always yes, but we can make that possibility smaller, and we must not fail at any time, as terrorists have to succeed only once.

We should expect anything, from a clean bomb to a dirty one (although, strictly speaking, there is no such a thing as a clean bomb); anything could happen, and new methods would be used. The big powers should continue their assistance to developing countries to enhance their nuclear security tools.

The world of today is facing common threats, and problems will not be solved unless common efforts are exerted; because of this we would like to stress the importance of regional cooperation. Our goals should be twofold: to decrease the production of dangerous material and to decrease the chances for minds to be made dangerous. The international community should take into account deeper issues regarding some underlying grievances of the people of our region, most importantly the Middle East peace process.

National, regional and international efforts must not only be coordinated but also integrated if we are to overcome the challenges ahead of us.

3.1. A proposal

On 8 December 1953 it was said: ‘Atoms for peace’. Now, on 16 March 2005, we suggest a new slogan to go hand in hand with the previous one: ‘Peace for atoms’.

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APPROACH OF THE NUCLEAR REGULATORY AUTHORITY OF ARGENTINA TOWARDS NUCLEAR SECURITY

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Abstract

The possibility that radioactive sources and nuclear and other radioactive material could be intentionally used to harm and terrorize people is not new. However, 11 September 2001 and other recent events increase its likelihood. The increasing problem of orphan sources, cases of illicit trafficking of radioactive material and attempts by sub-State actors to acquire such material have led to the adoption of concrete actions to strengthen global nuclear security. The experience gained to address these problems has been reflected in the conclusions of preceding international conferences convened by the IAEA and other organizations and in several actions adopted at the international and national levels. We are of the view that global nuclear security strongly depends on the existence in each country of robust regulatory infrastructures in radiation and nuclear safety, physical protection, emergency preparedness and response, and national safeguards that work together with relevant organizations through a comprehensive and systematic approach, based on well defined procedures and standards to ensure an adequate and timely response to potential malicious acts involving nuclear and other radioactive material. This paper describes the approach followed and the actions taken by the Nuclear Regulatory Authority of Argentina to enhance its capability to prevent and respond to such malicious acts, the experience gained to date and the future steps under consideration to maintain and improve such a capability. It also provides a broader Argentine perspective on nuclear security and non-proliferation.

1. INTRODUCTION

One of the findings of the International Conference of National Regulatory Authorities with Competence in the Safety of Radioactive Sources and the Security of Radioactive Materials held in Buenos Aires in December 2000 was the need to differentiate clearly those situations in which people are unintentionally exposed to radiation from those in which there is a criminal intent to irradiate other individuals, in order to frighten or produce disruption to people. At the international conference held in Stockholm in 2001, we noted that "The existence of competent regulatory authorities that set up adequate control measures is an essential component to lower the probability of occurrence of illicit uses of nuclear materials." Later, in March 2003, at the International Conference on Security of Radioactive Sources held in Vienna, we said that "The novelty of the new scenario is that it includes the malicious intention of those who could take possession of radioactive sources and other radioactive materials with the suicidal attitude to reach their goals, increasing the probability of occurrence and challenging the control system." We consider that these findings remain valid today.

2. DESCRIPTION OF THE PROBLEM

We are facing a multifaceted problem characterized by the coexistence and combination of different possible scenarios. Although the threat of malicious acts involving radioactive material is global, there is a need for each country to assess and establish its own credible threat scenarios in order to adopt the measures that better address them, aiming at achieving a reasonable level of protection without imposing an undue burden on the beneficial uses of radioactive sources.

To identify the regulatory approach to possible malicious acts, consideration should be given to the following facts:

(a) There are still a significant number of orphan sources that could not only be found by innocent people or be subject to inadvertent movements, but also could be taken by people with a malicious intent.
(b) The existence of illicit trafficking of radioactive and nuclear material and the possibility that this material will be used with a malicious intent.
(c) Attempts to acquire such material or to sabotage a relevant installation with the aim of harming or terrorizing people or to cause disruption.

We consider that there is not a 'one fits all formula' to address these realities, but the existence of robust regulatory infrastructures and concerted actions taken at the international level certainly reduce the likelihood of malicious acts involving radioactive material. Measures to respond to such acts, in particular those associated with nuclear terrorism, should be commensurate with those credible threats that each country has established. A stepwise approach is advisable, in particular to recognize that it is not possible to protect radioactive material from all possible threat scenarios associated with potential malevolent intents. The variables involved are infinite, thus the addition of security measures to the various uses of radioactive material should be based on definitions of credible situations, taking into account the risks associated with the sources. In this context, emphasis should be given to the prevention of and response to such events for high level radioactive sources.

3. ACHIEVEMENTS AND LESSONS LEARNED

Since the 1950s Argentina has established a control infrastructure based on knowledge of the risk associated with the deleterious effects of ionizing radiation, and an international philosophy for their assessment and limitation was developed. Registration, licensing and control of radioactive sources from the cradle to the grave have been essential features of our regulatory system. In this context, safety and security have always been closely related concepts.

As the nuclear regulatory authority with federal competence in radiation protection, nuclear safety, safeguards and physical protection, the Nuclear Regulatory Authority of Argentina (ARN) has established standards and regulatory requirements. It is also responsible for issuing licences and permits for any activity involving radioactive material and for controlling and verifying that these activities are performed in full compliance with ARN standards.

3.1. Nuclear security

With regard to nuclear security, the ARN has adopted a systematic approach at the national level based on the extrapolation of some physical protection criteria to the use, storage and transport of certain radioactive materials. It has also actively participated in the international efforts towards increasing nuclear security worldwide. On the other hand, the ARN considers that the IAEA's promotion of the use of knowledge management techniques to develop process flows, map safety knowledge and encourage knowledge sharing and the establishment of regional nuclear and radiation safety networks to preserve and strengthen existing knowledge and expertise in these fields is important. Prominent examples are the Asian Nuclear Safety Network, established in the framework of the IAEA's Programme on the Safety of Nuclear Installations in South East Asia, Pacific and Far East Countries, and the Ibero-American Radiation Safety Network in the framework of the Ibero-American Forum of Nuclear Regulators. The results to date are most encouraging and suggest that this pioneering work should be extended to other regions and eventually to a global safety and security network.

Moreover, since the very beginning, Argentina has been involved in the preparation and process of approval of the Code of Conduct on the Safety and Security of Radioactive Sources and is in full compliance with the criteria established in the Code of Conduct. This was also made clear when Argentina ratified its commitment to the Director General of the IAEA to support and follow such guidelines.

3.2. Import and export of radioactive material

The ARN is empowered to ensure that the import and export of radioactive material are made in agreement with the criteria established in the Code of Conduct, and in particular with the guidelines for the import and export of radioactive sources. These guidelines will enter into force towards the end of 2005 or beginning of 2006; however, Argentina has already implemented them fully.

3.3. Registered radioactive sources and material

Registered radioactive sources and material are under regulatory control, thus their illicit use would be prevented by this system, or, in the event of a breach involving those materials, there is a response scheme to allow the implementation of rapid remedial actions. Despite the low probability of illicit trafficking in the region, we cannot exclude it; therefore it has been necessary to adopt measures of 'security' in addition to those of existing radiation safety. In addition to this scenario, the possibility of malicious acts such as robbery, theft or sabotage to facilities with high radioactive inventories still exists, and the same is true in the case of the transport of radioactive material with a significant activity within national territory. A case under study by the ARN is the transport of ^{60}Co, as Argentina is one of the main producers of this radionuclide and normally makes transports that involve inventories of the order of 55 TBq (1.5×10^6 Ci). The measures adopted are similar to those of physical protection for the transport of nuclear material. In the case of installations handling high radioactive inventories (Class I installations, according to the classification in Ref. [1]), the ARN has established additional security measures based on its approach to physical protection.

3.4. Emergency preparedness and response

Originally, the ARN was the organization that defined the requirements for regulations in the prevention of and preparation for response to radiological and nuclear emergencies, and advised the acting municipal, provincial and national official organizations. In addition, the ARN always had its own 'on call' specialized operative groups able to respond to emergency situations involving radioactive sources, to act when the capacity of a facility was exceeded or in emergencies that took place in public (e.g. in transport related accidents). In Argentina an average of ten annual interventions in minor emergencies have occurred in the past 40 years, and the ARN has participated directly, accompanying the intervening security forces (fire, police, gendarmerie, prefecture, etc.).

In the area of emergency preparedness at relevant nuclear facilities, the ARN not only established the requirements and advised the acting official organizations, but also controlled and participated actively in emergency drills for more than 20 years. In 1997, when the Nuclear Act was enacted, the ARN was assigned the function "to direct the emergency actions during nuclear emergencies in the off-site area". From then on, the ARN began to organize, act in and direct nuclear emergency drills in which the coordinated actions of all the civil organizations and security and armed forces are carried out, all led by a centralized command led by an ARN operations head. For this new function the ARN follows the guidelines established in Ref. [2].

3.5. Specific training courses

Training courses and seminars at the national and regional levels are of great importance, not only for operators but also for the different control and security organizations. In this context it should be noted that the ARN has planned intensive training programmes at the national and regional levels (i.e. through the Security Commission of MERCOSUR). These courses are delivered in cooperation with the IAEA, ICPO-Interpol, Department of Energy, National Customs Agency, national response forces and the intelligence community.

3.6. Conclusion

In summary, we can say that the ARN is executing different activities in the fields of prevention, legislation, response, training and exchange of information to further enhance the physical protection of nuclear material and the security of other radioactive material. We have come to the conclusion that the most effective approach to nuclear security in the prevention, early detection and response to illicit or malicious acts involving radioactive material is realized through the existence of a robust regulatory infrastructure in each country, a permanent exchange of information and contact between the nuclear regulatory body, customs authorities, intelligence agencies and security forces, and the appropriate training of relevant staff. These are essential constituent parts of a systematic process that implies knowledge and assumption of responsibilities by all the participating institutions, working in a coordinated manner.

4. A BROADER ARGENTINE PERSPECTIVE ON NUCLEAR SECURITY AND NON-PROLIFERATION

Argentina has concentrated its efforts to make the non-proliferation regime more effective, more efficient and reliable. Last year, Argentina chaired two export control regimes: the Wassenaar Arrangement and the Missile Technology Control Regime. Argentina intends to contribute to strengthening export control regimes while making good use of them. Moreover, Argentina currently participates in all of the existing multilateral disarmament and non-proliferation regimes.

As regards domestic legislation, Argentina has implemented a strict control upon international transfers of certain materials, equipment, technology, technical assistance and services of a nuclear and missilistic nature, as well as on chemical and biological substances and material that may contribute to the production and dissemination of missiles and nuclear, chemical or biological weapons.

Argentine regulations do not restrict lawful trade, but introduce non-proliferation international criteria to national legislation. In that sense, Argentina welcomed the adoption of United Nations Security Council Resolution 1540, which affirms that "proliferation of nuclear, chemical and biological weapons, as well as their means of delivery, constitutes a threat to international peace and security". In October 2004 Argentina submitted its first national report to the United Nations Security Council Resolution 1540 committee.

Argentina supports the changes to be introduced within the framework of the International Maritime Organization (IMO) to the Convention for the Suppression of Unlawful Acts Against the Safety of Maritime Navigation to include the offence of transporting weapons of mass destruction as well as non-proliferation offences that the original convention did not cover.

Securing through the Global Threat Reduction Initiative (GTRI) nuclear and radioactive material that poses a threat to the international community is also a priority. Since the very beginning Argentina has taken part in the proposal and has supported the effort to reduce the world stockpiles of high enriched uranium employed in civilian nuclear programmes. Our experience in this field has been extended to other countries. Starting in October 2004 we have held several meetings with the US Department of Energy, noting that there is an extensive list of specific technical activities linked to reactor conversions that could integrate the efforts of both countries in order to address the objectives of the GTRI.

Tackling illicit trafficking through our territory is another part of the same problem. With this aim Argentina is negotiating a memorandum of understanding with the USA to implement the 'Megaports Initiative' to detect unauthorized transports of radioactive material. Considering the importance of the port of Buenos Aires, this initiative involves political and technical aspects to project experience to the whole region.

5. SYSTEMIC PROCESS APPROACH

We are facing a complex problem that requires worldwide attention, and which should be addressed by each country within the framework of an international system. To prevent and respond to possible malicious acts involving nuclear and other radioactive material, the ARN is working to develop different types of drills based on a systematic process approach.

6. MANAGEMENT PRINCIPLES

The ARN is introducing some principles to handle this new challenge, the purposes of which are to design and implement a quality management system to achieve the security goals. The greatest value would be obtained if the design becomes tailored to the quality management standards and guidelines known as the ISO 9000 family. They are very useful and practical for established quality systems in general and therefore would be applicable to this particular case. These documents introduce eight quality management principles, which are derived from the experience of the international experts who participate in ISO Technical Committee 176, Quality Management and Quality Assurance.

These principles will be used by the ARN to guide and control the security design towards improved efficiency and performance, because a security system must be a quality management system. The use of these principles requires:

(a) An understanding of the behaviour and attitude of the people directly and indirectly involved in the process. Starting from this point, present and future security projects must be designed and their concepts communicated, the main idea being that the projects should satisfy the expectations. The projects should also ensure a balance between the relevant safety and security requirements. To reach these objectives, it would be essential to establish:

(i) Unity of purpose;
(ii) A clear vision of the problem;
(iii) Common objectives;
(iv) Shared values.

(b) People motivated, with trust and no doubts about the process, with the required vision, adequate resources and good training. They should understand the methodology and move towards the goals and objectives desired by the ARN. If only a scientific approach to problem solving is considered, the approach may produce negative reactions.

(c) Managing by process of the organization, responsibilities, authorities, procedures, standards, resources and activities. That is to say, there should be management by process rather than a classic division of responsibilities by function. The process requires a manager whose main responsibility should be to define the design basis threat and the procedures and standards. The participants must act in coordination with procedures established a priori rather than by giving orders a posteriori through a hierarchical structure. The advantage of this approach is that the response to possible malicious acts is prompt and systematic. The process would include not only aspects of security but also the response to large scale emergencies in terms of radiological consequences, be they caused by terrorist attack or very low probability severe accidents. At present, the functions are being distributed according to the specific capacities of each organization involved (civil, local and national police, intelligence agencies, customs, security and armed forces), all of them forced by their own constituent laws to act in cases of disasters to protect the population and within the framework, knowledge and procedures established by the manager of the process.

(d) Design the processes as a global system and apply the principle of continual improvement. This approach would facilitate understanding of the interdependencies between the activities, tasks and processes, not only by the participants but also by the population as a whole, and achieving the goals in the most effective way. Decisions must be taken through reference to factual records, which imply accurate and reliable information; for this reason the methodology to design the processes should be based on an experimental approach.

In summary, in order to design and implement a working security system it is necessary to:

(1) Communicate a clear vision;
(2) Motivate a global participation;
(3) Organize the project like a network of processes;
(4) Build the model in an experimental way.

7. GENERAL STRATEGY FOR A PLAN OF ACTIVITIES TO COMBAT NUCLEAR TERRORISM: THE SECURITY PROCESS

In order to reach the required objectives, a comprehensive management strategy should be implemented, based on ISO 9000. This section describes the methodology and actions required in each phase, with particular emphasis on the early alert and response phases. For these phases, the systematic process includes:

(a) All national organizations that should be involved in the assessment and establishment of the threats and the timely exchange of information;
(b) Those national organizations that may be involved in emergency situations originating from significant damage to relevant nuclear facilities (e.g. nuclear power plants and other installations holding a high inventory of radioactive material).

The methodology would require several stages to reach the objective. The first stage is to establish the step by step process and subprocesses required. In order to raise levels of quality, safety, reliability and efficiency, the methodology should be based on a combination of processes. Processes require resources and must be managed to achieve the desired output. A subprocess' output is the next subprocess' input. The final product is often the result of a system of processes.

In the problem under consideration the process is a security process. The security process is not an independent process by itself but rather it is part of a network of other processes, mainly the safety process.

The second stage of the process design would require a documentation plan. This plan should include:

(1) Training;
(2) Communication;
(3) Standards;
(4) Procedures;
(5) Assessment.

With all of these elements a plan should be formulated in order to implement the processes.

A thorough review of the ARN has indicated that all the procedures used previously were applicable to the above described new quality management system. However, additional procedures had to be included in order to give a systematic approach to the problem.

8. BASIC DESIGN OF THE NEW APPROACH

The basic design of the new approach comprises five subprocesses:

(a) Early alert/alarm;
(b) Prevention;
(c) Protection;
(d) Response;
(e) Follow-up actions.

Each subprocess is different, and is characterized by:

(1) The quality and type of those who participate in the subprocess;
(2) The number and type of organizations to which they belong;
(3) The participants' knowledge;
(4) The goals each subprocess must reach.

The manager of the security process should define:

(i) The design basis threats;
(ii) The standards and guidelines.

Moreover, the manager should think in terms of a quality management system, management responsibility, resources, measurement, improvement, procedures and training of all participants.

9. SUBPROCESSES

9.1. Alarm

The competent intelligence agencies should be involved in this first stage (in the specific case of Argentina, the national intelligence organization is advised on technical nuclear matters by the ARN). The intelligence agencies are responsible for detecting potential threats to divert nuclear and other radioactive material and attacks on relevant facilities or transports.

9.2. Prevention

The ARN has an important role in this second stage, while the customs, national security forces, national and local police and other law enforcement agencies should also be involved. They should prevent and avoid theft, sabotage and other malicous actions by means of the relevant control systems under their jurisdiction.

9.3. Protection

In this stage the relevant national forces should be assigned with specific responsibilities. In the specific Argentine case, while the national gendarmerie has particular responsibilities for the protection of nuclear installations, the ARN has active functions through its regulatory power and in the preparation of its own capacity for responding to the possible radiological consequences of attacks or severe accidents. The forces are defined and the locations and magnitude depend on the facilities and transports of material that must be protected.

9.4. Response

The first phase of the response stage is defined by the application of a priori established procedures. This takes place during the first hours of a serious security breach. While the differences between an emergency created by a security breach and one resulting from an accident must be recognized, at this stage a connection exists between radiological emergencies that result from a failure in safety and those created by an adverse security situation. Whenever it is not possible to make a detailed evaluation, previously defined and tried countermeasures must be applied. Later, when detailed evaluations need to be made, a crisis committee, to be established a priori, should play the most important role in the subsequent decision making process. In the specific case of Argentina, the ARN is designing an ad hoc emergency drill. The design will be ready by the beginning of April 2005, with the aim of organizing a drill in the last quarter of 2005.

The ARN is the organization that leads activities that promote improvement of the response capacity of the Argentine State, not only in the local area in the first 24 hours (where the first effort is made), but also on the regional and national scale during the later stages, which may include distances of several hundreds of kilometres from the location of the incident and periods of weeks, months or years.

9.5. Follow-up

The main objective of this phase is to carry out:

(a) Studies and assessments of the work carried out to introduce the modifications to be applied in the next process;
(b) Verification of compliance of the process with the relevant measures and requirements.

10. FUTURE STEPS

The ARN is considering means to further improve its capability to prevent and respond to malicious acts involving radioactive material. Future actions include strengthening of the systematic approach at the national level by consolidating the activities foreseen in each of the above mentioned phases and increasing its participation in the international efforts under way, particularly within the framework of IAEA activities and the GTRI and other relevant multilateral actions.

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NUCLEAR SECURITY: LESSONS LEARNED FROM THE PAST AND FUTURE GLOBAL DIRECTIONS

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1. INTRODUCTION

Protecting society against acts of nuclear terrorism is a new global scale challenge facing the international community today. Improving nuclear security is therefore a common goal of the international community, including the IAEA.

The events of 11 September 2001 in the United States of America demonstrated a new scale, dedication, sophistication and organization of terrorist groups and prompted the international community to re-evaluate the threat posed by terrorism, including the threat against civilian nuclear programmes. This re-evaluation has underscored the awareness of a much broader threat picture. The willingness of terrorists to risk their own lives in attempts to cause death and destruction must be seriously taken into account. While the threat related to the potential construction of nuclear weapons remains the most devastating, the ways and means through which radioactive material may be dispersed for the purpose of causing harm to persons, property and the environment must be strategically reconsidered.

The newly established IAEA definition of nuclear security as "the means and ways of preventing, detecting, and responding to sabotage, theft and unauthorized access to or illegal transfer of nuclear material and other radioactive substances, as well as their associated facilities" underscores a broad strategic approach to nuclear security. Recent developments and the re-evaluation have more clearly identified overlaps and synergies between nuclear security, safety and safeguards. The IAEA General Conference in recent years, and prominently in 2004, noted in the resolution on nuclear and radiological security, inter alia, that strengthening the safety of radioactive sources contributes to enhanced security of such sources. It also noted that safeguards agreements and additional protocols, as well as States' systems of accounting for and control of nuclear material, contribute to preventing illicit trafficking by deterring and detecting diversion of nuclear material.

Modern society, whether in developed or in developing countries, depends on the availability of nuclear energy and on the day to day use of radioactive material in medicine, agriculture, industry and research. Before 11 September these activities were mainly covered by safety rules regarding health and the environment. Since 11 September it is clear that these activities also require adequate security. For the continued, and expanded, use of nuclear energy or radioactive material, nuclear security is indispensable and an important prerequisite for successful and sustainable development.

We are now at a time for reflection and for developing our plan for the next stage of our collective efforts of improving nuclear security. More than three years have passed since September 2001, and we have gained much experience. Through many of our nuclear security services, expert assistance and training events, we have assisted Member States in their efforts to improve their preparedness and response capabilities and have acquired a much better understanding of Member States' problems and concerns and of the need for further support. This conference aims at reviewing where we stand and the achievements we have made as well as identifying the issues and directions for our future efforts.

2. EVOLUTION OF NUCLEAR SECURITY AND LESSONS LEARNED

2.1. Global picture

The end of the Cold War was marked by a shift from a bipolar structure of global security into a more complex and unpredictable configuration of world affairs. It also brought about new security challenges, that is an increased probability for low density regional, national or subnational conflicts with new and more dispersed threats emanating from a larger number of actors, including non-State actors, terrorists and criminals. The audiovisual impact of modern media has dramatically enhanced the sociopsychological impact on a global scale of such conflicts. The number of cases of illicit trafficking in nuclear material recorded since the 1990s raised concern about the international physical protection regime and triggered an effort to enhance our capabilities for prevention, detection and response regarding terrorist acts, as well as to strengthen the Convention on the Physical Protection of Nuclear Material.

Immediately after the events of 11 September, based on a re-evaluation of its implications, the IAEA identified four types of threat to nuclear security:

(a) theft of a nuclear weapon; (b) construction of a crude nuclear explosive device using stolen nuclear material; (c) malicious use of nuclear and other radioactive material, including radiological dispersal devices; and (d) an attack on or sabotage of a nuclear installation or transported material. The potential targets of such acts include nuclear power plants, fuel cycle facilities, research reactors, laboratories and storage sites as well as locations all over the world where these substances are used in a broad range of non-nuclear applications.

To prevent these events from happening, we must have a comprehensive, global approach to nuclear security, based on internationally accepted instruments, and which is implemented worldwide and in broad partnerships. Should a nuclear terrorist act happen, we would all suffer, directly or indirectly, as fellow passengers in the same boat.

2.2. Achievements

The IAEA is now approaching the completion of its three year programme to protect against nuclear terrorism. Among the most important achievements is the increased Member State awareness of the need for a comprehensive approach covering prevention, detection and response to possible acts of nuclear terrorism. During these three years, the IAEA has conducted more than 125 security advisory and evaluation missions, and more than 100 training events in more than 70 countries. We have helped Member States to improve regulatory systems and the physical protection of nuclear facilities. In several cases, the IAEA has facilitated bilateral assistance. The three year programme had a target expenditure of $36 million. As of this moment, with eight months of the third year left, the IAEA Nuclear Security Fund has received about $35 million and the expenditures are on or above annual targets. Sustainability of the IAEA's programme will require continued voluntary funding and in-kind contributions.

We have been moving the programme towards the implementation of nuclear security improvements at regional and national levels and at facilities. The results of missions, training courses, workshops and other activities are used in the preparation of comprehensive integrated nuclear security support plans for individual States. These plans include national level improvements required for the regulatory infrastructure, improvements at facilities and locations and for transports, as well as improved radiation detection capabilities at border crossings. These plans provide an effective tool for coordination and an overall goal for the State, based on an understanding of what needs to be done over a period of time. The first steps for the implementation of such plans have been taken in several Member States.

2.3. Some lessons learned

The activities performed during the past three years have also been an extensive learning process. Complexity and changes in the political situation have sometimes resulted in revisions and delays in implementation. However, the achievements made have confirmed that a multitrack and holistic approach including synergies between safety, safeguards and security is warranted for protection against acts of nuclear terrorism. These efforts would, in fact, underpin the promotion of the use of radioactive material in support of sustainable development and could also help eradicate the root causes of conflicts and terrorism. While there is a fundamental unpredictability in the continued funding of these activities, planning and implementation need to assume that resources will be available for a longer period of time.

3. DIRECTIONS FOR THE FUTURE

3.1. Building a global nuclear security framework

Expanded use of nuclear power and introduction of new nuclear energy technology as well as a rapidly growing use of radioisotopes in science and medicine are evidence of the important role of nuclear technologies in sustainable development. The privatization of the nuclear power industry, deregulation and government reform point to expanded security related responsibilities for the private sector and other non-governmental organizations (NGOs). Thus international consensus on establishing and enhancing a global nuclear security framework is urgently needed.

The top tier of this framework is based on the universal implementation of prevailing legal instruments relevant for nuclear security.

In July 2005, after five years of work, a conference will be convened with the States Parties to the Convention on the Physical Protection of Nuclear Material to review proposals for its strengthening. A strengthened convention, including an obligation by States Parties to implement physical protection for nuclear material in domestic use, storage and transport, in addition to international nuclear transport, will be a major step forward for improved nuclear security. The revised Code of Conduct on the Safety and Security of Radioactive Sources, approved by the IAEA Board of Governors in 2003, complements this convention. More then 70 countries have declared their political commitment to implement the Code. In addition, the Board approved and the General Conference endorsed supplementary guidance for this Code on import–export in 2004. Both policy and technical issues relevant to the implementation of the Code will be further discussed in Bordeaux in June 2005, and a series of regional meetings is planned on this topic. Safeguards agreements and additional protocols are recognized for their contribution to the nuclear security framework. Likewise, the Convention on Nuclear Safety, the Convention on the Early Notification of a Nuclear Accident and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency are also important components of the institutional framework. Concerted efforts for the full implementation of all of these instruments will remain the highest priority for the coming years. IAEA guidelines and recommendations, to be published in our nuclear security document series, will facilitate these efforts.

3.2. Weak links and cooperation

Terrorists or criminals will target weak links in the system. Eliminating these weak links is therefore a high priority in a comprehensive approach. We must work towards creating a critical mass of intellectual and institutional resources in States to absorb the competences required to maintain robust nuclear security systems and facilitate their implementation. Cooperation among relevant national authorities would benefit from national networks. Enhanced interaction between governments, NGOs and academic institutions will facilitate exchange of new ideas and increase public awareness of measures taken to improve nuclear security. The establishment of regional centres for cooperation will facilitate interaction among States. Such interaction will promote increased awareness to give the necessary priority to effective nuclear security. At the same time, however, sensitive information must be protected. The legitimate need for transparency must always be balanced with the equally legitimate requirement not to risk any disclosure of sensitive information.

Cooperation among international organizations with mandates of relevance for nuclear security is essential for promoting the implementation of effective national nuclear security systems. Additional to effective intergovernmental networks, information exchange mechanisms with and between international and regional organizations are needed to promote a constructive dialogue and well coordinated cooperative actions for nuclear security.

4. CONCLUSION

This conference aims at examining whether enough has been done to make it much more difficult for any terrorist or criminal to use nuclear or radioactive material to cause death, destruction and panic. We know that the consequences of an explosion of one crude nuclear or radiological device would be catastrophic or create severe disruption, and that the consequences of sabotage of a nuclear facility could halt the development of nuclear technology for peaceful purposes and hamper socioeconomic development.

Compared with three years ago, we are now better prepared, owing to international cooperation and the focus on preventive measures. However, much remains to be done in all areas of prevention, detection and response, within a comprehensive and cooperative approach. A strengthened global nuclear security framework requires useful information in order to have a good understanding of the threats, risks and worldwide status of nuclear security. It also requires effective long term measures to prevent any terrorist from completing successfully a malicious act, as well as measures to detect and respond to smuggling or theft of nuclear material or radioactive substances. There is also a need to continue efforts to reduce the threat by eliminating, as much and as quickly as possible, the quantities of high enriched uranium or plutonium from peaceful applications for which they are not needed. Finally, it requires measures to improve the security of poorly protected nuclear installations and the transport of nuclear and radioactive material. For the effectiveness of these measures, they should be implemented in a more consistent and coherent manner through closer cooperation and coordination, complying with international instruments, related guidelines and recommendations. To achieve the goals of adequate protection of our society against the existing threat level of nuclear terrorism, a higher and more predictable level of resources compared with the present programme will be required for the IAEA for the next cycle of the coming four years.

There are still sufficient opportunities to be more proactive than reactive. Let us use our collective wisdom to identify ways and means of protecting our society from nuclear terrorist acts.

NUCLEAR SECURITY: FRANCE'S VIEW

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1. INTRODUCTION

Other papers have discussed the nature of the threat of malicious acts involving nuclear and other radioactive material and associated facilities. Of course, responsibilities in these fields fall primarily on the States, but governments must be able to base themselves effectively on international references as well as on international exchanges and cooperation, starting from the high level of protection from which nuclear activities already benefit.

Strengthening the response to malicious acts involving nuclear and other radioactive material should take into account national specificities and the diversity of threats. The responses cannot be unique.

Against this background, I would like to present briefly the international action of France, which is based on three axes:

(a) Cooperation with the IAEA and under the auspices of the IAEA in the context of its Nuclear Security Plan of Activities;
(b) Initiatives and partnerships in relevant international forums;
(c) Strengthening of the international framework.

2. COOPERATION WITH THE IAEA

The IAEA has a pre-eminent role to play, in conformity with its Statute, in the security of nuclear material and facilities, and France supports its plan of action in this field, adopted by the Board of Governors in 2002. France provides financial and technical support, in particular through a series of actions conducted in cooperation with the IAEA. This cooperation is action orientated and aims at strengthening national capacities (International Physical Protection Advisory Service) or coping with emergency situations (Côte d'Ivoire, Georgia).

Cooperation is institutionalized through a plan of action, and we are planning to conclude with the IAEA in the near future an arrangement for the establishment of a French cooperation and support plan for nuclear security.

This support plan will constitute the cooperation framework under which the Government of France will provide technical support to the IAEA in the areas of nuclear security and protection against nuclear terrorism. It will principally address matters relating to physical protection, security of radiation sources, improvement of national systems and adherence to relevant international instruments.

3. GLOBAL FRAMEWORK AND INTERNATIONAL PARTNERSHIP

In the past years the renewed efforts of the international community against the proliferation of weapons of mass destruction and the risks of nuclear terrorism have resulted in a number of initiatives. To name just a few, the global partnership established by the G8 in 2001 with the countries of the former Soviet Union, then the adoption by the G8 of two action plans, the first in 2003, under French presidency, on the security of radioactive sources, and the second in 2004, under US presidency, on non-proliferation. The Proliferation Security Initiative (PSI) was launched in 2003 to prevent illicit transfers, which can feed proliferation.

France is fully committed to the development of international cooperation in the peaceful uses of the atom through non-proliferation undertakings, including comprehensive safeguards agreements and additional protocols, and has supported these efforts and taken an active part in them. France's action is also through the Strategy of the European Union Against the Proliferation of Weapons of Mass Destruction, adopted by the European Council in December 2003, and the measures in United Nations Security Council Resolution 1540.

3.1. United Nations Security Council Resolution 1540

The unanimous adoption of United Nations Security Council Resolution 1540 on 28 April 2004 was a historic event. This was the first Security Council resolution to address the threat that the proliferation of weapons of mass destruction (WMD) and their means of delivery, in particular by non-State actors such as terrorist organizations, poses to international peace and security.

The resolution puts special emphasis on the threat of illicit trafficking and recognizes this new dimension in the issue of proliferation.

France, like its European Union (EU) partners, recognizes that countries may require assistance in implementing the provisions of this resolution and expressed its willingness to provide it when needed and appropriate.

3.2. G8

At the Evian summit in 2003, under French presidency, the members of the G8 recognized the proliferation of WMD and their delivery systems together with international terrorism as the pre-eminent threat to international peace and security. I will put special emphasis on the question of the security of radioactive sources.

The security of radioactive material and sources is an area in which France has since the outset been at the fore of international efforts. In 1998 France organized with the IAEA the Dijon Conference, which first examined the question of the security of sources. France played an active part in the subsequent development and adoption of the Code of Conduct on the Safety and Security of Radioactive Sources.

French experts and teams have also contributed to a number of IAEA or bilateral projects to locate and secure orphan sources. Last year, due to exemplary cooperation with the IAEA and the authorities of Côte d'Ivoire, French authorities successfully removed from the University of Cocody in Abidjan an irradiator and its high activity sources, which were no longer in use.

The Hofburg Conference signalled increased mobilization of the international community, and showed the way for further action, most notably through the action plan adopted by the G8 in 2003 at the Evian summit. For its part, the IAEA has developed action plans to work concretely on the safety and security of sources and, more recently, to improve national regulatory infrastructures. The Code of Conduct was revised to better address security aspects, and guidance on the import and export of sources was developed and was adopted last September by the IAEA Board of Governors.

Looking into the future, I should like to mention the International Conference on the Safety and Security of Radioactive Sources, to be held from 27 June to 1 July 2005 in Bordeaux. We expect it to highlight the benefits of international cooperation, to take stock of achievements and to allow launching further partnerships, projects and instruments.

3.3. Global Threat Reduction Initiative

France welcomed the Global Threat Reduction Initiative. It is necessary to give appropriate attention to vulnerable nuclear and radioactive material and to address areas and material not adequately covered by current national or international programmes. In such cases the required security must be ensured by establishing in a sustainable manner a safe and secure environment, but also, as necessary, by securing, removing or disposing of these materials.

As a material that can be directly used in nuclear weapons, high enriched uranium (HEU) is the primary focus of these efforts. Conversion of HEU cores to low enriched uranium (LEU) has been undertaken through programmes that dealt initially with the conversion of fuel, for which the substitution could be achieved rapidly based on available technology. Although a longer term endeavour, the development of replacement technology for conversion to LEU is an avenue of development. France has undertaken a research and development programme to develop the advanced fuel that will allow such conversion and is currently cooperating with the United States of America to intensify this effort. The development of a new type of fuel is difficult and a long term programme. This research and development dimension must be taken into account.

Even under the most favourable schedule, conversion of HEU cores will take a minimum of a decade. In the meantime, we are of the view that States with HEU fuelled reactors should demonstrate their commitment to managing their facilities in the most secure manner and adopt in that respect a transparency policy that would give the required assurances to the international community.

In that connection, I should like to state that France stands ready to cooperate in establishing guidelines on the management of HEU for civilian purposes, which could use the model of the plutonium guidelines adopted, on a voluntary basis, by the main States concerned.

4. PROMOTION OF INTERNATIONAL INSTRUMENTS

4.1. Convention on the Physical Protection of Nuclear Material

Based on the results of the working group of legal and technical experts convened by the Director General of the IAEA, Austria, with the support of 24 other States, including France, has submitted to States Parties a draft amendment to the Convention on the Physical Protection of Nuclear Material. France took part in the preparation of this amendment, which, if adopted, will significantly strengthen the Convention with respect to all national and international activities involving nuclear material. France welcomes the convening of a diplomatic conference to adopt the proposed amendment, which will be an essential contribution to strengthening the nuclear non-proliferation regime.

4.2. Safeguards agreements and the Additional Protocol

Concerning the verification of non-proliferation obligations under the Treaty on the Non-proliferation of Nuclear Weapons (NPT), the IAEA strengthened and integrated safeguards system based on a combination of a comprehensive safeguards agreement and an additional protocol must become the standard to ensure maximum credibility of verification, and also to demonstrate the commitment of the States Parties and their support to the NPT. This is why France, in cooperation with its partners and with the IAEA, has conducted for several years a diplomatic action with a view to universalizing both instruments. In particular, France has undertaken diplomatic démarches to that end to French speaking States in Africa and in the Indian Ocean. France has also participated in initiatives in the same direction conducted by the G8 and the EU.

We are facing a challenge that requires a long term strategy and multifaceted approaches.

PANEL DISCUSSION 1

GLOBAL NUCLEAR SECURITY: CHALLENGES FACING THE INTERNATIONAL COMMUNITY

Chairperson: **W. Renneberg** (Germany)

Members: **M. Bahran** (Yemen)
Ambassador L.F. Brooks (United States of America)
A. Kotelnikov (Russian Federation)
E. Oakden (United Kingdom)
R. Racana (Argentina)
T. Taniguchi (IAEA)
P. Thiébaud (France)
Huazhu Zhang (China)

W. RENNEBERG (Germany): My impression from the presentations made earlier in this session by the panellists is that we have a fairly well developed set of nuclear security measures but differ in how we apply those measures. There has been a lot of talk about what ought to be done, and the focus should now perhaps be on how we ought to proceed.

In that connection, I wonder whether there is a need for what one might call ‘reference levels’ designed to ensure minimum standards in the application of the various measures and for security analysis guidelines.

There has also been a lot of talk about security culture, which all seem to agree is very important in the security area, just as safety culture is very important in the safety area. In the latter area, we have guidelines for safety management, and I wonder whether it would be helpful to develop guidelines for security management.

G. TSHELANE (South Africa): I believe that, within the framework of the Missile Technology Control Regime (MTCR), the United States of America and the United Kingdom, at some stage, advocated the development of a treaty for controlling transfers of dual use technology. Would any of the panellists care to comment on this matter?

E. OAKDEN (United Kingdom): Controlling transfers of dual use technology without placing undue constraints on legitimate trade is a major challenge with which various countries and institutions are grappling. Much more needs to be done in order to arrive at an appropriate balance.

AMBASSADOR L.F. BROOKS (USA): I am not aware that anyone ever advocated the development of a formal treaty, and I would be surprised if anyone did. In the nuclear technology area, changes occur so frequently that — in my view — it is much better to have simply guidelines and informal groups such as the Nuclear Suppliers Group.

C.R. STOIBER (USA): There are a large number of bilateral, regional and international assistance programmes under way in the nuclear security area, and I think there is a danger of confusion due to overlapping. In my view, there is a need for those programmes to be coordinated. The question is — how? One mechanism might be a kind of clearing house through which national institutions could consult about matters such as priorities, training, equipment and standards.

AMBASSADOR L.F. BROOKS (USA): When I think about coordination, I think about coordination within large governmental structures like ours and coordination at the international level.

In the USA four to five years ago different governmental entities were taking different approaches, but I think we have solved that problem.

At the international level, there is in my view a good deal of coordination. For example, we are coordinating our efforts closely with those of the UK and the Russian Federation.

One difficulty that arises at the international level is due to the fact that some countries are less willing than other countries to deal with certain third countries. There the answer is information sharing.

As regards the idea of a clearing house, I believe that the idea of one where some participants tell others what to do and what not to do is unrealistic and that such a clearing house would probably not be welcome.

Where possible, IAEA recommendations should be followed as a kind of global standard, but we need to bear in mind that every country is unique.

E. OAKDEN (UK): In agreeing with what Ambassador Brooks just said, I would add that there is a danger of too much time being spent on formal coordination.

There is a lot of informal coordination, with people simply telephoning each other or sending each other email messages, and what worries me more than the possibility of confusion due to overlapping is the possibility of gaps.

I believe that the United Nations Security Council's 1540 Committee is quite a good forum for identifying gaps and trying to ensure that they are filled.

P. THIÉBAUD (France): I agree with what Mr. Oakden just said about the United Nations Security Council's 1540 Committee and what Ambassador Brooks said about IAEA recommendations. France believes that coordination at the international level should be through the United Nations Security Council or the IAEA.

For France, regional coordination at the European Union level is very important, because some of its policies relevant to nuclear security are determined in a European Union context.

Much of France's cooperation in the nuclear security area takes place at the bilateral level, owing to the need for confidentiality regarding certain matters.

T. TANIGUCHI (IAEA): As regards coordination, the IAEA would like to see the establishment of a global nuclear security framework based on instruments such as the Convention on the Physical Protection of Nuclear Material (CPPNM) and the Code of Conduct on the Safety and Security of Radioactive Sources and with guidelines facilitating the implementation of these instruments.

As I mentioned in my presentation, the IAEA is planning to publish a number of Security Series documents. The process of preparing these documents will be a transparent one, with all IAEA Member States invited to comment on the drafts. However, the IAEA will not be establishing security standards in the way that it establishes safety standards, which it is authorized to do by its Statute. Among the reasons for this are the importance of confidentiality in the nuclear security area — compared with the nuclear safety area — and the fact that in the nuclear security area one has to take account of the sociopolitical conditions in different countries and of the threat levels associated with different facilities.

At the same time, three years of IAEA experience have made it clear to us that the common aspects of nuclear security are at least as important as confidentiality and the country and facility specific aspects. This has been emphasized particularly by the law enforcement community. In my view, a balance needs to be found through the accumulation of experience.

As regards nuclear security culture, after the Chernobyl accident it was not very difficult to promote nuclear safety culture and translate it into safety management methodologies, but a lengthy 'fermentation process' was necessary before it became established. In my view, the establishment of security culture will require an even longer fermentation process.

W. RENNEBERG (Germany): In my view, 'nuclear security culture' is not a very clear concept. I think we should be focusing on nuclear security management.

T. TANIGUCHI (IAEA): In the nuclear safety area, the transition from recognizing the importance of safety culture to embedding safety culture in particular countries and facilities was not easy. I do not think that such a transition will be easy in the case of nuclear security culture, given the specificities of different countries and facilities.

P. SHAW (UK): A major consideration relating to the physical security of radioactive material is the trustworthiness of personnel. How does one vet personnel in such a way as to minimize the insider threat?

M. BAHRAN (Yemen): That is a big problem, which can probably be resolved only on a case by case basis.

In Yemen, a company exploring an oilfield located in a tribal area will normally hire people belonging to the tribe in question for basic tasks such as driving, in order that the tribe may benefit financially from the activity. However, the company will not use members of the tribe as security officers or in other sensitive positions. Resolving personnel trustworthiness issues takes a lot of time.

S.B. ABDEL-HAMID (Egypt): In the nuclear safety area, many people say that safety culture is simply a matter for technicians. In my view, however, there is a public dimension to nuclear safety culture — public awareness and support are necessary, and I believe that the same applies in the nuclear security area.

E.T. FEI (USA): In his presentation, Mr. Thiébaud mentioned the idea of guidelines for the management of high enriched uranium similar to those for the management of plutonium. Would he care to expand on that idea?

P. THIÉBAUD (France): We should like to see all States with significant stockpiles of high enriched uranium agreeing, in the interests of transparency, to accept commitments similar to those accepted by States in the case of plutonium. So, we are thinking in terms of bringing those States together in order to ascertain whether a common understanding can be reached regarding such commitments.

E.S. LYMAN (USA): In my view, there is a growing tension between the idea that the nuclear terrorism threat is an international threat requiring an international response and the idea that the physical protection of nuclear material and facilities is a purely national responsibility of sovereign States.

What does one do in the case of a State with substandard arrangements for the physical protection of nuclear material and facilities which believes that it is doing the right thing and does not want international advice? I have in mind not simply ‘marginal’ States not represented at this conference, but my own country, as I am concerned about certain aspects of its physical protection arrangements which, in my view, violate international norms. For example, only last week the US Nuclear Regulatory Commission approved a significant relaxation of the standards for the physical protection of MOX fuel at nuclear power plants in the USA.

I believe that we should move away from the idea that the physical protection of nuclear material and facilities is an exclusively national issue.

R. RACANA (Argentina): When we began developing a nuclear security programme in Argentina, we found that scientists, the police, the armed forces and others — because of their different cultures — had different approaches to the problem. It was very difficult to arrive at a common methodology, but we did so by dividing the overall nuclear process into subprocesses in such a way that groups of organizations with similar cultures could carry them out successfully. We relied on guidelines rather than precise instructions, leaving the various organizations and groups a large measure of independence.

The approach is going to be tested early in April 2005, with a simulated attack on a vehicle carrying radioactive cobalt.

S.B. ELEGBA (Nigeria): Unlike Argentina, my country does not have a nuclear power programme, but I believe that it can learn from the experience of countries which have nuclear power programmes creating greater nuclear security challenges. I would therefore like to see such countries working together with the IAEA in the area of nuclear security culture. Further, I believe that we need standards for the security of nuclear material.

A. HAGEMANN (Germany): In his presentation, Mr. Taniguchi mentioned the IAEA's Nuclear Security Plan of Activities. Could countries which are assisting other countries through bilateral support programmes use that plan or adapt it for their own purposes?

T. TANIGUCHI (IAEA): As I said in my presentation, the plan is designed to clarify goals and improve the coordination of bilateral and multilateral support programmes.

Although nuclear security is essentially a national responsibility, there is great scope for mutual learning through the sharing of experience. That is what the IAEA is aiming to promote above all.

W. RENNEBERG (Germany): I have a fundamental question — What is the most relevant deficiency in the nuclear security area?

P. THIÉBAUD (France): My answer to that question will probably not satisfy the Chairman.

In France there is no single issue that we think needs to be addressed as our top priority. In our view, we need to make progress through a multifaceted approach covering international instruments, information exchange, training and so on. We are very conscious of the fact that the strength of a chain depends on the weakest link.

W. RENNEBERG (Germany): Then what is the weakest link in the nuclear security chain?

P. THIÉBAUD (France): Again, my answer will probably not satisfy the Chairman.

In my view, the weakest link will differ from one country to another. International guidelines are necessary, but there is no common solution for all countries.

T. TANIGUCHI (IAEA): Perhaps the weakest link is an excessive focus on small developing countries, with regard to the security of radioactive sources. There are security weaknesses in countries with large scale nuclear activities, often due to complacency. In the IAEA's view, effectiveness is more important than efficiency at the present stage in the learning process, although the IAEA will continue its efforts to increase both.

M. BAHRAN (Yemen): As far as countries like mine are concerned, the weakest link is control at the national borders. For such countries, regional cooperation in the border control area is very important.

HUAZHU ZHANG (China): Effective border controls are very important for the prevention of illicit trafficking in nuclear and other radioactive material.

A. KOTELNIKOV (Russian Federation): Perhaps we should not talk openly about weakest links. If terrorists know what the weakest link in a country is, that country's nuclear security efforts may be in vain.

It is always possible to improve nuclear security through greater efforts and the acquisition of better equipment, but the associated costs will rise. So there has to be some sort of compromise.

In the Russian Federation, we have been using equipment produced by the defence industry of the Soviet Union. Although the equipment is rather old and does not look very good, it works quite well in the field, whereas some of the new equipment, although of pleasing design, does not work so well. We, with the help of some of our foreign partners, are looking into this problem.

AMBASSADOR L.F. BROOKS (USA): I agree with Mr. Thiébaud that the weakest link will differ from one country to another — also, it will differ from year to year.

The Chairman's original question was — What is the most relevant deficiency in the nuclear security area? In my opinion, as indicated by Senator Nunn in his presentation, it is the fact that all governments have a number of other concerns to which they attach at least as much or a little more importance than to nuclear security, for reasons of national pride, economic advantage or political interest.

The participants in this conference obviously take the threat of nuclear terrorism seriously, that is why we are here, but the governments of our countries regard that threat as just one of the many things which they must deal with.

E. OAKDEN (UK): I believe that an important aspect of nuclear security is public support for the necessary expenditures and that such support will be forthcoming only if the public realizes what the consequences of a major act of nuclear terrorism could be. We need to educate people not only about the benefits offered by peaceful applications of nuclear energy but also about the responsibility involved.

P.A. COMELLA (USA): As someone who has been involved in the effort to have the CPPNM amended, I hope that this conference will help to ensure that the Diplomatic Conference to Consider and Adopt the Proposed Amendments to the Convention on the Physical Protection of Nuclear Material scheduled to take place in July 2005 results in an amended CPPNM. It would create a basis on which all countries with nuclear material and facilities can establish appropriate physical protection programmes. It will also provide a coherent framework for IAEA assistance in the area of physical protection — leading to greater effectiveness and, in due course, greater efficiency.

E. OAKDEN (UK): In my view, that statement is very relevant to what Mr. Lyman said previously.

I think that we should be aiming for a network of interlocking national and international regulations and that an amended CPPNM could represent a step in the right direction.

S. FERNÁNDEZ MORENO (Argentina): There are many programmes under way in the nuclear security area, and perhaps we now need a mechanism for assessing their effectiveness and efficiency. However, such a mechanism would have to be based on a common understanding as to the problems we are facing. At this conference there have been references to acts of terrorism and sabotage carried out by non-State actors, but also to nuclear weapons proliferation, which in my view has to do with States rather than non-State actors. There appear to be two distinct sets of problems — not just one.

There is a risk that our efforts will prove to be insufficient, but there is also a risk of overreacting and suffocating activities that are legitimate and beneficial.

As regards nuclear security culture, it might be worth considering the feasibility of establishing information exchange networks like those already existing in the nuclear safety area.

D. PUIG (Uruguay): Besides strengthening of the CPPNM, I should like to see the Code of Conduct on the Safety and Security of Radioactive Sources converted into a convention.

A. IBRAHIM (Egypt): In my view, for the time being there is no need for a further convention. The guidelines for nuclear transfers in the IAEA's INFCIRC/254 series of documents are sufficient.

A. STREZOV (Bulgaria): As there have been references to regional cooperation in the border control area, I would mention that in October 2002 Bulgaria and Turkey carried out a border control exercise involving the seizure of enriched uranium. Both countries learned very useful lessons from that exercise.

I would also mention that an international technical working group of which I was a member has produced a very simple model action plan which developing countries can apply in combating illicit trafficking in nuclear and other radioactive material.

W. RENNEBERG (Germany): In my view, the most basic problem facing us is attributable to the fact that there are, on the one hand, countries which possess nuclear weapons and, on the other, countries which do not possess nuclear weapons and therefore consider themselves to be at a political or economic disadvantage. I believe that the threat of nuclear terrorism will be with us as long as the gulf between those two groups of countries persists and that worldwide nuclear disarmament accompanied by the placing of all enrichment and reprocessing facilities under international safeguards is therefore essential.

EFFORTS TO STRENGTHEN THE GLOBAL NUCLEAR SECURITY FRAMEWORK

(Session 3)

Chairperson

R. STRATFORD
United States of America

TOWARDS A STRENGTHENED CONVENTION ON THE PHYSICAL PROTECTION OF NUCLEAR MATERIAL: THE PATH TO NEW RESPONSIBILITIES

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Abstract

Following the work of an experts meeting to discuss whether there is a need to revise the Convention on the Physical Protection of Nuclear Material (CPPNM), a group of legal and technical experts was convened in December 2001 by the Director General of the IAEA in order to prepare a draft amendment to the CPPNM. The task for this group was to widen the scope of the CPPNM and to strengthen its measures, while staying inside the constraints established by the experts meeting. The group produced its final report in March 2003. During this time a number of key questions were addressed by the group, ranging from the implementation of the fundamental principles of physical protection, to the criminalization of offences involving nuclear material and nuclear facilities, and from international law, to cooperation in the case of sabotage of nuclear facilities. Closely based on this work, an amendment has been proposed and is to be submitted to a diplomatic conference later this year. The difficulties of this exercise, the solutions proposed and the consequences they carry for strengthening the global nuclear security regime are explored in this paper.

1. A BRIEF HISTORY

Friday 14 March at 4.30 p.m.: I lower my gavel at the desk in the IAEA Boardroom to mark the adoption by consensus of the final report of the Open-ended Group of Legal and Technical Experts to Prepare a Draft Amendment of the Convention on the Physical Protection of Nuclear Material (CPPNM) (the L&T Group), convened by the Director General of the IAEA. This is the end of the sixth and last meeting of this L&T group. It lasted two full weeks and resulted in a proposed draft amendment, strengthening and broadening the scope of the CPPNM.

The proposed draft amendment represents a dramatic widening of scope and strengthening of the present CPPNM, while still seeming acceptable to the States Parties that took part in the work of the group. In particular, the commitments to establish a legal and regulatory framework and a regulatory authority are major steps for consolidating, in the long term, improvements in physical protection realized in the frame of bilateral or multilateral cooperation. These possible amendments set a standard for the revision of the CPPNM, and no State Party could expect support for an amendment deviating from this standard.

However, this final report was not the end of the road: points remained to be decided upon, and the diplomatic conference process needed to be initiated by a State Party or a group of States Parties. On 25 May 2004, the Austrian Foreign Minister, on behalf of Austria and 24 other countries[1], asked the Director General of the IAEA, pursuant to Article 20 of the CPPNM, to circulate a proposed amendment, based on this final report, and, where necessary, on the group's discussions. A majority of States Parties have since expressed their support for a diplomatic conference to examine this proposed amendment, to be convened later this year.

Why was this task, which was initially foreseen to last one week in a rapid and decisive campaign, to take so many months, and to ask for so much effort from all participants?

I shall come back to this question later, but as a preliminary remark it must be noted that the timing of this whole exercise was exceptional — some might say unfortunate. The L&T group was convened by a letter of M. ElBaradei dated 6 September 2001 — just five days before the 11 September 2001 attacks — and it adopted its final report on 14 March 2003 — less than a week before the beginning of the war in Iraq. Indeed, the very first debate addressed before the group even met was whether the recommendations at the basis of the mandate of the group were still valid after 11 September, and the very last point, left unsolved, was in turn whether there was, or whether there should be, an impact of the draft amendment on the laws of war.

2. THE MANDATE

In terms of substance, the experts meeting related to strengthening the CPPNM had concluded in May 2001

[1] Australia, Bulgaria, Canada, Croatia, Czech Republic, Denmark, Finland, France, Greece, Hungary, Ireland, Italy, Japan, Lithuania, Luxembourg, Norway, Poland, Portugal, Sweden, Switzerland, Turkey, Ukraine, United Kingdom and United States of America.

> "that there is a clear need to strengthen the international physical protection regime, of which CPPNM is an important component"

and recommended to cover the following subjects:

"• Extension of scope to cover, in addition to nuclear material in international transport, nuclear material in domestic use, storage and transport, as well as protection of nuclear material and facilities from sabotage.
• Importance of national responsibility for physical protection.
• Importance of protection of confidential information.
• Physical Protection Objectives and Fundamental Principles, and
• Definitions."

It had also to clearly exclude the following subjects:

"• A requirement to submit reports to the international community on the implementation of physical protection.
• A peer review mechanism.
• A mandatory application of INFCIRC/225, e.g. through direct reference and also through 'due consideration'.
• A mandatory oversight of physical protection measures.
• Nuclear material and nuclear facilities for military use."

As I indicated in my introduction, this mandate was at first challenged, particularly the so called negative list, in relation to the 11 September attacks.

3. DIFFICULTIES, DEBATES AND SOLUTIONS

3.1. Transparency versus confidentiality

There is clearly a conflict between the protection of confidentiality and items on the negative list. Three items (reports to the international community, peer review mechanism, mandatory oversight) would all need some level of disclosure of confidential information to persons not thoroughly screened for trustworthiness.

Safety specialists, acknowledging the complexity of their field of work, have developed the concept of peer reviews, complemented by transparency measures and broad information for the public. However, if in nuclear safety transparency is an obligation, in physical protection it is an offence. We owe the public and the wider international community a fair, unbiased view of protection levels against terrorism, at the same time as we owe them a strict protection of sensitive information: the path is narrow.

The solution cannot be found solely in the dispositions of a convention; it must also be built from different bricks: managed communication to the public, in-confidence exchanges between government entities with like concerns, etc. This is a whole new area to be explored by nuclear security specialists.

3.2. External control versus sovereignty

Closely linked is the question of whether there should be some sort of control over the way States discharge their commitments; though not voiced in so many words, two types of question were raised. To exercise control, one needs a detailed common reference, available to many people, and we are again confronted with the issue of confidentiality; however, more importantly, there are so many parameters that may answer a given threat (police availability versus the thickness of concrete for a given facility, or armament of guards versus the strength of fences, to take only two examples, or even the right to use deadly force — a constitutional question in many countries) that only nationals may grasp the problem in its entirety for a meaningful control. The sovereignty principle remained untouched.

3.3. Laws of war or international humanitarian law

Questions on the laws of war or international humanitarian law did not find consensus by the group, and needed further discussion before an amendment could even be proposed. If we avoided the usual deadend associated with the definition of terrorism, the definition of sabotage was our pitfall. This issue arose at the worst of times, literally days before the beginning of the war in Iraq. Does international humanitarian law (the law of war) allow for violent actions against nuclear facilities? Is it suitable, desirable or necessary for the CPPNM to regulate in this field? Was it for the L&T Group to address these matters?

My understanding is that the way forward is through avoiding as much interference as possible between the CPPNM and the laws of war. The diplomatic conference will tell us if such a goal has been reached.

3.4. To what extent should the fundamental principles be mandatory?

The 12 fundamental principles of physical protection of nuclear material and nuclear facilities have a history of their own: they were drafted in 2000, endorsed by the IAEA Board of Governors[2] in 2001 and further welcomed by the IAEA General Conference[3]. The way they were to be introduced into the draft amendment was a challenge on many grounds.

They were not written in the form of legal obligations, but rather in an incentive form, akin to some aspects of the Convention on Nuclear Safety. This is most evident for the principle of security culture, the priority of which can hardly be a hard commitment, the concept not being yet fully understood and defined.

Another difficulty comes from the very different question of which States it aims to apply to. Owing to the penal aspects of Article 7, the CPPNM should ideally become universal, hence it should be equally applicable to States mastering the totality of the fuel cycle as to States with a very small nuclear programme or no programme at all. This asked for a level of flexibility in the implementation of the fundamental principles, found with much difficulty and debate, in differentiating two of the principles (legal framework and authority) as the compulsory minimum. This is coherent with the French experience of implementing such principles over the years, as an evolutionary process and as a contract for progress.

Additionally, the provision for a lower threshold on nuclear material was introduced, to address very small quantities under a de minimis provision.

3.5. Balance between cooperation and external oversight

The addition of sabotage as a matter for cooperation seemed straightforward, but was not. It raised concerns that cooperation could be a Trojan horse to exert a hidden external oversight and to override the sovereignty principle. A careful study of the Convention on Early Notification of a Nuclear Accident was necessary, to borrow the relevant elements and answer the appropriate concerns.

3.6. Penal law

Under Article 7 many difficulties were linked to the introduction of the offence of ‘sabotage’, which was meant to cover terrorist attacks on nuclear facilities. One difficulty already mentioned was the possible link with international humanitarian law.

Two more difficulties were linked to sabotage:

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[2] On 11 September 2001 through document GOV/2001/41.

[3] On 21 September 2001 in resolution GC(45)/RES/14 B.

(a) Whether to introduce the offence of damage to the environment as a consequence of sabotage of a nuclear facility. In civil law, including at the international level, such damage is already recognized, while in penal law it is not. The opinions were balanced, and it could well be that the diplomatic conference may debate this further.
(b) Whether to qualify as sabotage only acts resulting in radioactive release (or the risk thereof). Without qualification, it would have ‘sanctuarized’ all parts of a nuclear facility. With the qualification as retained, the life of judges will not be made easier.

4. MAJOR ADVANCES

In this section I will look at the consequences of the possible (probable?) adoption of the amendment as circulated by the Director General of the IAEA. As I am an optimist, I shall avoid the conditional mode.

4.1. A legislative and regulatory framework

From my ten years of experience of working in nuclear security, debating with nuclear operators and discussing with government authorities, from my four years of experience debating in Vienna the strengthening of the CPPNM with specialists from all over the world, from the innumerable papers devoted to the subject that I have read during that period of time, and from my former department’s experience of cooperating in strengthening nuclear security in various countries, I have been convinced of three major findings:

(a) An operating organization is never as happy as when it has predictability, provided by a known regulatory framework.
(b) At the same time, an operating organization is often reluctant to spend money, whatever its convictions and sense of public duty, when security obligations are not written into law.
(c) A government tends to forget the urgency of nuclear security when its requirements, and associated expenses and efforts, are not dictated by parliament and the law. Let us not forget that nuclear security asks more often than not for coordination between security forces, justice and law enforcement bodies, and regulators and scientific experts. A very meaningful effort indeed!

4.2. An independent authority

Allow me to quote from one of the contributed papers, by D. Nikolic, on nuclear security in Serbia:

> "The absence of the effectively independent regulatory body which is responsible for authorization, inspection and enforcement, provided with adequate authority and power to discharge its assigned responsibilities, results in overall loosening of the control over nuclear safety and security."

This is a crystal clear declaration, which I totally agree with. I could add that once controls begin to get loose, the effectiveness of security likewise deteriorates. These two points — legislative framework and independent authority — represent the absolute necessity for sustainability of all results achieved in the past ten years or so by the international community and by donor countries in upgrading physical protection systems where necessary.

If only these two obligations stayed in the amendment it would still be a fundamental step towards strengthening physical protection worldwide. If they are not implemented in a suitable way, then the future of nuclear security looks bleak to me.

4.3. A necessary set of new offences

Article 7 of the amended CPPNM will allow parties to prosecute new offences, and oblige them to do so or to extradite offenders. The new offences — mainly illicit trafficking and sabotage (terrorist attacks) — are at the forefront of concerns that have arisen over the past ten years. Their introduction in itself will give a new dimension to the CPPNM, as it calls for its universality. While the present CPPNM is seen as a matter for States with civil nuclear programmes, the new offences may concern every State, and universality will forbid all shelter to offenders.

4.4. A framework for cooperation and assistance

The framework for cooperation and assistance has been updated, renewed and strengthened, and the pre-eminent role of the IAEA as a central point for assistance in physical protection matters has been recognized.

At a time where cooperation in physical protection, be it bilateral, regional or multilateral, has become accepted and necessary, a stronger framework than the one existing was required. The whole set of new obligations created in the amendment create new responsibilities for recipient countries, as well as for those knowledgeable in physical protection.

5. WHAT NEXT?

It will not have escaped your attention that some concepts (security culture, design basis threat, etc.) contained in the fundamental principles need work to become an everyday reality at nuclear facilities. This is a task that has already been undertaken, and variously advanced. Their proper implementation will necessitate more time and a lot of training. When the amendment is in force (I hope…), lawyers and magistrates will have to prosecute new offences, which in some cases will mean starting with a blank page. Many more examples come to mind of consequences to come, all going in the right direction of a more effective, revised CPPNM, of strengthened physical protection worldwide.

I was supposed to write about 'instruments' of the physical protection of nuclear material, but this paper would not be complete without briefly mentioning two prominent documents that are an integral part of the international nuclear security framework.

One is the Code of Conduct on the Safety and Security of Radioactive Sources, which will be addressed in other papers. Let me just say that given the high level of concern about radioactive sources, its status could merit an upgrade.

The other is the recommendations on the Physical Protection of Nuclear Material and Nuclear Facilities[4], for which I have a soft spot. I chaired its fourth revision in 1998, and it is high time that others take up the task of reviewing it. It is an essential part of the nuclear security framework; it is a precious guide for newcomers to physical protection and for States setting up a physical protection framework. Just a caveat: to keep it as a living reference document, it should stay as guidelines, otherwise its necessary evolution will become impossible.

[4] INFCIRC/225/Rev.4.

CODE OF CONDUCT ON THE SAFETY AND SECURITY OF RADIOACTIVE SOURCES

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Abstract

The physical security of radioactive sources has long been an element in radiation protection, but the type and nature of the security threat has changed, which is reflected in the revised Code of Conduct on the Safety and Security of Radioactive Sources adopted in 2003. The General Conference of the IAEA has urged countries to make a political commitment to work towards implementation of the Code, and now just over 70 countries have done so. Import–export guidance has been developed, and these aspects of the Code should be implemented from the end of 2005. Some of the issues that face countries as they work towards implementation of the Code are discussed in the light of Australia's experience.

1. INTRODUCTION

Linking the words 'safety' and 'security' when speaking of protecting radioactive sources is not something that only happened after September 2001. For example, one of the first international conferences in the current series of conferences was held in Dijon in 1998 and was entitled the International Conference on the Safety of Radiation Sources and Security of Radioactive Materials.

This linkage of safety and security in the protection of radioactive sources arose from some bitterly learned experience. The worst emergencies involving radioactive sources have arisen in circumstances in which there was lax or non-existent physical security, allowing sources to be stolen for their perceived value as scrap metal. This was most spectacularly demonstrated in the accident in Goiânia in Brazil in 1987, but there have been a number of other examples, including quite recent ones, in different regions of the world.

The sine qua non of radiation protection when it comes to radioactive sources is the maintenance of effective control over the source throughout its life; that is, during manufacture, utilization, storage, transport and disposal. Effective control includes effective physical security arrangements.

Of course, the effectiveness of physical security must be assessed against the threat being guarded against, and it is changes to the threats being considered that have led to the current particular focus on the security of radioactive sources as a part of overall nuclear security.

2. A HISTORY OF THE CODE

It was the Dijon Conference that was the immediate progenitor of the Code of Conduct on the Safety and Security of Radioactive Sources. That conference recommended that efforts be made to investigate the formulation of "international undertakings concerned with the effective operation of national regulatory control systems" that could attract broad adherence.

The finding, after being incorporated into the IAEA's Action Plan for the Safety of Radioactive Sources and the Security of Radioactive Material — note the use of both words — in September 1999 resulted in negotiation by a small group of representatives of IAEA Member States of the Code of Conduct on the Safety and Security of Radioactive Sources.

In September 2000 the IAEA General Conference invited Member States [1] to take note of the recently drafted Code and to consider appropriate means of ensuring its wide application.

Before proceeding further: what is a Code of Conduct? It is an international legal instrument, but of a non-binding nature; that is, the Code itself does not have the force of international law. Its international application can only arise from the commitments that countries may choose to make. As can be inferred from the wording of the Dijon Conference finding, there was debate about the form of the "international undertaking" that should apply in this area. In the event, the negotiators of the 2000 Code — and the IAEA's governing bodies — were of the view that the Code should be recommendatory in nature.

What did this first Code say about the security of radioactive sources? The objective of the Code was stated to be "to achieve and maintain a high level of safety and security of radioactive sources". Security was generally mentioned throughout this Code, but there were no specific security requirements. When security was mentioned, the drafters had in mind the sort of incidents I referred to above — the almost inadvertent theft of sources by people ignorant of their true nature. There was certainly an emphasis, however, on regaining control of orphan sources, and this remains an important part of the current Code.

The world did change after 11 September 2001: it transformed the nature of the threat against which the security of radioactive sources needed to be considered. There now needed to be a much stronger and clearer focus on security in relation to the possible deliberate acquisition of sources by people who had the intention to use the sources for malicious purposes.

3. THE CURRENT CODE

In the context of the IAEA's overall response to the threat of nuclear terrorism, a revised Code of Conduct on the Safety and Security of Radioactive Sources was negotiated by representatives of a wide range of IAEA Member States.

The Code [2] now has a wider objective of:

(a) Achieving and maintaining a high level of safety and security of radioactive sources — as in the first Code; but also
(b) Preventing unauthorized access or damage to, and loss, theft or unauthorized transfer of, radioactive sources so as to reduce the likelihood of:
   (i) Accidental harmful exposure to such sources; or
   (ii) The malicious use of such sources to cause harm to individuals, society or the environment; and
   (iii) Mitigating or minimizing the radiological consequences of any accident or malicious act involving a radioactive source.

The Code focuses on sealed radioactive sources falling under Categories 1, 2 and 3 of the IAEA's Categorization of Radioactive Sources [3]. These are the most hazardous sources, although the Code does note that appropriate attention needs to be paid to the regulation of other potentially harmful radioactive sources. This includes aggregations of lower activity sources.

With regard to security, the Code has an extensive set of relevant guidance. Firstly, it states as a basic principle that every State, to protect individuals, society and the environment, should ensure that radioactive sources are safely managed and securely protected during and at the end of their useful lives. The steps taken to achieve this goal should include the promotion of safety culture and of security culture.

The Code recommends that the State should have in place a regulatory system that, analogous to safety, places the prime responsibility for the security of radioactive sources on the persons being granted the relevant authorizations. The system of national legislative and regulatory control should provide for measures to reduce the likelihood of malicious acts, including sabotage, connected with the threat as defined by the State. It also should include strategies and rapid responses to regain control over orphan sources, and to mitigate or minimize the radiological consequences of malicious acts involving radioactive sources. The State should define its domestic threat and assess its vulnerability against this threat for the various sources used within its territory.

The State should also promote awareness among industry, health professionals, the public and government bodies of the security hazards associated with orphan sources. It should also emphasize to designers, manufacturers of sources and devices, suppliers, users and managers of disused sources their responsibilities for the safety and security of sources.

The legislative and regulatory system recommended by the Code should, inter alia:

— Prescribe and assign governmental responsibilities to ensure the security of radioactive sources;
— Specify the requirements for the security of radioactive sources and of the devices in which sources are incorporated;
— Provide for requirements for security measures to deter, detect and delay the unauthorized access to, or the theft, loss or unauthorized use or removal of, radioactive sources during all stages of management;
— Provide for requirements relating to verification of the safety and security of radioactive sources, through safety and security assessments, monitoring and verification of compliance, and the maintenance of appropriate records.

The role of the regulatory body remains central. The Code recommends that the regulatory body needs to have the authority to establish regulations and issue guidance relating to the security of radioactive sources, and that it has the authority to require those who intend to manage radioactive sources to seek an authorization, and to submit a security plan or assessment as appropriate for the source and/or the facility in which the source is to be managed, if deemed necessary in the light of the risks posed and the current national threat assessment.

The regulatory body also needs to have the authority:

- To attach clear and unambiguous conditions to the authorizations issued by it, including conditions relating to minimum performance criteria and maintenance requirements for equipment and systems used to ensure the security of radioactive sources, the measures to determine, as appropriate, the trustworthiness of individuals involved in the management of radioactive sources, and the confidentiality of information relating to the security of sources.

- To obtain any relevant and necessary information from a person with an authorization, in particular if that is warranted by revised security assessments.
- To liaise and coordinate with other governmental bodies and with relevant non-governmental bodies in all areas relating to the security of radioactive sources.
- To provide guidance on appropriate levels of information, instruction and training on the security of radioactive sources and the devices or facilities in which they are housed, to manufacturers, suppliers and users of radioactive sources.

These recommendations about the security role of the national legislative and regulatory regime are consistent with the continued and systematic requirements for the safety of sources.

The Code also recommends that each State establish a national register of sources, initially covering Categories 1 and 2. It notes that the information in such a register should be appropriately protected. It suggests that for efficiency in the exchange of information about radioactive sources between States, there should be international harmonization of the formats of registers.

Finally, the Code also addresses the matter of import–export controls, which are discussed below.

4. COMMITTING TO THE CODE

In September 2003 the IAEA Board of Governors approved the Code. The 2003 General Conference welcomed that approval and endorsed the objectives and principles of the Code, while recognizing that it is not a legally binding instrument [4].

The General Conference went as far as it reasonably could to support commitment to a non-binding instrument in urging States to write to the IAEA Director General to the effect that the State fully supports and endorses the IAEA's efforts to enhance the safety and security of radioactive sources, is working towards following the guidance contained in the Code of Conduct on the Safety and Security of Radioactive Sources and encourages other countries to do the same.

By the end of February 2005, 71 countries had written to the IAEA Director General to this effect.

5. IMPORT–EXPORT GUIDANCE

The Code contains a general provision to the effect that imports and exports should be undertaken consistent with the provisions of the Code and with international transport standards. For Category 1 and Category 2 sources there are provisions for explicit authorization, as appropriate, by both the importing and exporting States of the import–export.

The Code recommends that the importing State consent to an import only if:

(a) The recipient of the source is legally authorized to receive and posses the source;
(b) The State has the appropriate technical and administrative capability, resources and regulatory structure needed to ensure that the source will be managed consistent with the provisions of the Code.

The exporting State has the obverse obligations to assess the receiving State's authorization of the recipient and its regulatory capability — insofar as practicable. The Code also contains a provision allowing for exports and imports to take place otherwise than in accordance with the above provisions in exceptional circumstances.

However, the Code's provisions in relation to import and export were somewhat general in nature. The potential for inconsistent interpretation — particularly as to when prior consent from the importing State was required and as to the application of the 'exceptional circumstances' provision — gave rise to concerns regarding the maintenance of a level playing field between the different exporters of radioactive sources. In order to address these concerns, and to develop mechanisms for exchange of information between the importing and exporting States, more detailed guidance was developed by Member States and endorsed at the General Conference in 2004 [5].

This guidance establishes the mechanisms that should allow the import–export provisions of the Code to be applied in a consistent manner by Member States.

The question as to whether the proposed recipient of a source is authorized by the importing State is a matter of mechanics. On the other hand, the judgement by the exporting State as to whether the importing State has the appropriate infrastructure to manage the source safely and securely could be more problematic. The guidance allows for information from the IAEA to be taken into account if agreed by the importing State. This information includes:

(i) Responses by the importing State to a brief self-assessment questionnaire;
(ii) Whether the importing State has written to the IAEA Director General indicating that it is working towards following the guidance contained in the Code;
(iii) Whether an importing State that participates in the IAEA Model Project has met Milestone 1, which requires establishment of a basic legal and regulatory infrastructure.

As noted above, both the Code and the supporting guidance allow for authorization of exports otherwise than in accordance with the general rules, in exceptional circumstances. What might constitute 'exceptional circumstances' is expanded upon in the guidance.

Clearly, the effectiveness and practicability of these arrangements will be tested in the international marketplace. The IAEA General Conference in 2004 noted that more than 30 countries had committed themselves to implementing the guidance as from 31 December 2005, and encouraged States to implement it on a harmonized basis.

6. WORKING TOWARDS IMPLEMENTATION OF THE CODE AND THE GUIDANCE

Australia has written to the IAEA Director General in the terms urged by the 2003 and 2004 General Conference resolutions. That is, Australia has made an international political commitment that it is working towards following the guidance in the Code. What does this mean in practice, and what challenges are we finding in meeting this commitment?

For a middle sized country, Australia has a complicated regime of radiation regulation: six states, two territories and the national government each regulate the use of radioactive sources within their jurisdiction. Nonetheless, we would regard our system of radiation protection as meeting international best practice in safety, and there is no shortage of cooperation between the jurisdictions. At the level of the leadership of the regulatory bodies there is a commitment to a national source security strategy that incorporates all the elements of the Code, including a national register of dangerous radioactive sources.

At the highest level of the leadership of each jurisdiction a review is being completed that can be expected to give its blessing to the directions laid down in the national source security strategy.

With regard to the import–export regime, we are moving to change our customs regulations, which will enable us to operate the regime recommended by the guidance. We are also moving into the consultation with industry that will be necessary to ensure that these regulations meet the legal and administrative requirements of regulatory decision making and that they can be effectively implemented.

Another area in which we have had strong commitment and made good progress has been the integration of radiological emergency response personnel into the nation's overall counterterrorism response.

The challenges for Australia — and I suspect for all radiation safety regulators — lie in translating the guidance of the Code into real life regulation, and making that regulation effective on the ground.

The use of radioactive sources occurs in a great variety of medical, industrial and research settings, each with a different existing security culture. There are a few large and highly sophisticated users of radioactive sources that will want to use and be capable of using a performance outcomes approach to the security regulation of sources. For the most part, however, source users will seek, and appreciate being given, prescriptive approaches.

We are dealing with this by drawing up a Code of Practice on Security and Physical Protection of Radioactive Sources. Once accepted later this year, the Code will be adopted by all the Australian authorities through their regulations and licence conditions.

It would be counterproductive if we overregulated for security and effectively destroyed the beneficial uses of radioactive sources. We have been grappling with how to link physical security measures to levels of threat, and hope to achieve this through linking to national alert levels.

One important aspect will be the encouragement of a security culture. Again, at the levels of the regulators there is a good liaison between radiation safety specialists and police, customs and intelligence agencies. Extending that liaison down the line to the broad mass of users, and extending that resultant security culture, will be a challenge.

We are looking forward to discussing our working towards the Code later this year at the International Conference on the Safety and Security of Radioactive Sources: Towards a Global System for the Continuous Control of Sources Throughout their Life Cycle, to be held in June in Bordeaux.

7. CONCLUSION

The Code of Conduct on the Safety and Security of Radioactive Sources has now been established as an international benchmark for the effective control of radioactive sources, being accepted by more than 70 countries. It deals effectively with integrating classic safety and current security requirements. Its implementation with regard to import–export will soon begin. Full and effective implementation within each country will take time, particularly to bring about full acceptance of a security culture among the many different users of radioactive sources.

ACKNOWLEDGEMENTS

Several Australian Radiation Protection and Nuclear Safety Agency staff assisted with comments on this paper, as did S. McIntosh of the Australian Nuclear Science and Technology Organisation, the latter from his perspective as Chair of the working groups that drew up the Code of Conduct and the import–export guidance.

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UNIVERSAL COMPLIANCE: THE CARNEGIE ENDOWMENT'S NEW STRATEGY FOR NUCLEAR SECURITY

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I would like to give a short briefing on Universal Compliance, the Carnegie Endowment's new strategy for nuclear security. It contains our recommendations for a new, effective nuclear non-proliferation strategy, set out against a description of the rapidly evolving security environment. I will begin with a description of that environment, but first I would like to remind you of the process that we followed in producing this report:

— We launched a draft of the report at the Carnegie International Non-proliferation Conference in June 2004. In the months afterwards we sought comments and expert opinion from experts in the United States of America and around the world — we visited 15 countries. I personally briefed the report to Russian experts at our Carnegie Moscow centre on two separate occasions. We truly tried to get comments from the broadest possible community, and we are grateful to those of you who provided them to us.
— I would also like to emphasize that this was a team effort, involving our President, Jessica Mathews, and four other senior experts at the Endowment. Credit and blame can therefore be spread around — but it was truly a remarkable process.

First, let us talk about the rapidly evolving security environment that we find ourselves in: the threat. The main difference in the threat from past years is, of course, the burgeoning attention to nuclear terrorism. The nexus between terrorism and nuclear weapons and fissile material drives the urgency of our approach: we are facing a crisis that must be confronted in the most effective way possible, securing, reducing and eventually eliminating fissile material and nuclear weapons. We are also facing the emergence, possibly, of a number of new States with perhaps just a few nuclear weapons, which also creates a qualitatively new threat to the international community. For those States currently possessing nuclear weapons as nuclear weapon States under the Treaty on the Non-proliferation of Nuclear Weapons (NPT), we are concerned that the utility of nuclear weapons is being heightened, the trend towards their use is growing and the encouragement to other States to acquire nuclear weapons is therefore increasing. One key point about our view of the threat is that we are not predicting the collapse of the NPT; in fact, we remain rather optimistic about its future, based on the successes of the past. However, we are concerned about the threat of regime breakdown if we do not address three problems: dual use fuel cycle facilities; the 'three State problem' involving the three States that possess nuclear weapons but are outside the NPT — India, Israel and Pakistan; and the end of negotiated, verifiable reductions in nuclear weapons.

Next, I would like to speak for a moment about what we mean by Universal Compliance. In the environment that I have just described, where we must confront the possibility that nuclear weapons or fissile material might fall into the hands of terrorists (i.e. non-State actors that cannot easily be deterred), every country has an equal interest in countering this horrific threat. Every country, in other words, has an equal interest in preventing the spread and use of nuclear weapons. Every country has an equal obligation to avoid contributing to the spread of nuclear weapons and weakening the norm against their use. Thus the five nuclear weapon States under the NPT also contribute to the threat, unless they are reducing their arsenals and moving towards disarmament, as per Article VI of the NPT: universal obligations, universal responsibilities, universal compliance. I would also like to note that we treat fissile material essentially in the same way as nuclear weapons in the report, so that States possessing fissile material have responsibilities essentially the same as nuclear weapon States: to protect, reduce and eventually eliminate those materials.

Next, I would like to introduce the six core obligations that we propose in the study: (a) make non-proliferation irreversible; (b) devalue nuclear weapons; (c) secure all fissile material; (d) stop illegal transfers; (e) commit to conflict resolution; and (f) solve the 'three State problem'. It also introduces you to the notion that we emphasize of defence in depth: that only by pursuing progress in each of these six areas will we be on the road to success in revitalizing the non-proliferation regime. We do not insist on equal success in every area: in fact, we recognize that a report with over 100 recommendations is a hard pill for the international policy community to swallow. Many of the recommendations will take some time to develop in detail, and to build consensus around, others are not ripe at the moment, but might be in future years. Nevertheless, we do believe that a number of our recommendations are priorities that can and should be pursued on a fast track basis. Let me turn next to a few of these.

I will select some key recommendations under each of our core obligations:

- 'No easy exit' means that we believe that non-proliferation should be irreversible; there should be no going back once a country accepts the obligations of the regime. If they try to go back, they should not get a free ride. Thus one recommendation we have is to put in place a legal framework to punish withdrawals from the NPT; we also recommend that steps should be taken, pursuant to United Nations Security Council Resolution 1540 and other measures, to criminalize nuclear proliferation activities.
- Under 'ending production' fall some of our most controversial recommendations. We discuss, for example, development of a means to halt the construction of new fuel cycle facilities and guarantee nuclear fuel services to countries that want to sustain or expand nuclear power. We do not recommend any particular approach, although we make note of the proposals that have been made by, among others, the Director General of the IAEA, Mohamed ElBaradei, and President Bush. Our most controversial recommendations are related to ending production of fissile material. We propose that the USA work with other countries to end the production of high enriched uranium (HEU) (greater than 20% ^{235}U) and adopt a pause in the separation of plutonium. Under the HEU production ban, enrichment needed for supply of low enriched uranium fuel would continue, with enhanced monitoring and transparency measures. In our earlier draft we had proposed an actual pause in enrichment activities, but discussions with industry representatives and officials made it clear that there were many technical, economic and security challenges that outweighed the benefits.
- In the section on 'devaluing nuclear weapons' fall the recommendations that represent the biggest differences with the current US administration, for example our support for ratification of the Comprehensive Nuclear-Test-Ban Treaty. However, in other areas, such as implementing negotiated, verifiable reductions and de-alerting, there might be some scope for progress. For example, transparency discussions related to implementation of the Moscow Treaty might bear fruit, which would add to the existing verification regime of START I in beneficial ways. Our new recommendation in this arena is the 'plan to disarm'. This is a significantly new idea, although it is not unique: the United Kingdom has already undertaken an effort to produce a white paper on what monitoring and other measures would be required to move towards disarmament as required in Article VI. We propose that all States with

nuclear weapons and fissile material undertake such a process, leading to an international discussion on the concrete measures that would be required to pursue nuclear disarmament.

— Another new idea of this kind falls under our obligation "to secure all materials". We propose to formulate a contact group at a high level of all States that possess weapons usable material. The goal of this group would be to establish a new, single enhanced standard for nuclear material and weapons security. It would be constituted at a high level in order to ensure new attention to this urgent issue in national capitals. We would also like to see the industry and technical communities involved actively in this effort.

— Under 'stop transfers' we place considerable emphasis on strengthening enforcement, and give the Bush administration a great deal of credit for already taking steps in this direction. We are complimentary of the Proliferation Security Initiative and other steps, including toughening inspections. One of the new ideas that we advance are voluntary measures that industry, banks and financial institutions could undertake to introduce a 'proliferation awareness' into their business decision making.

— 'Resolving conflicts' is a huge area, and we offer a wide range of specific ideas in our Chapter 6 — applying the strategy to regional crises such as India–Pakistan, Iran, the Middle East and North Korea. The point I would like to emphasize is that the nuclear States, we believe, have a special obligation to work on these problems, to do some heavy lifting to try to resolve them.

— Finally, I would like to emphasize our approach to the 'three State problem', focused on India, Israel and Pakistan. We propose to drop the long standing demand that they give up their nuclear weapons, in the absence of a durable peace in their regions. In return, we argue that they should accept all of the non-proliferation obligations of the five original nuclear weapon States under the NPT. These include embracing nuclear disarmament as a clear and unequivocal goal, establishing the highest global standards for preventing exports of nuclear related technologies, foregoing tests and adopting state of the art standards for nuclear material and warhead protection. We strongly emphasize that the world does not owe them anything for pursuing this course — for example, new nuclear power reactors. In our view, the obligations flow in the other direction — States with nuclear weapons must demonstrate a commitment to strengthen the norm against the spread and use of nuclear weapons. If these States were willing to dismantle their enrichment and reprocessing facilities and place all of their reactors under international safeguards, then the international community might consider supplying them with additional reactors and fuel services. Once again, our focus is on universal responsibilities, obligations and compliance to strengthen the non-proliferation regime.

We will continue the process of developing these recommendations through the NPT review conference in May 2005 and in other national and international venues. The Carnegie International Non-proliferation Conference will be held in Washington, DC, on 7–8 November 2005 and will provide a further opportunity to debate our proposals. Copies of Universal Compliance may be downloaded from the Carnegie web site: www.CarnegieEndowment.org

DISCUSSION

K. RAGHURAMAN (India): As Ms. Gottemoeller mentioned India in her presentation, I should like to make some comments and ask her a question. India, as a responsible State with nuclear weapons, has unilaterally declared a nuclear weapon testing moratorium and made a ‘no first use’ declaration. As regards the fact that India is not a party to the NPT, I would recall that in the early 1960s, within the framework of an 18 nation initiative, India was very active in efforts to develop a universal, non-discriminatory treaty for preventing the proliferation of nuclear weapons. Unfortunately, in the middle of the negotiations, a deviation from universality arose owing to an arbitrary distinction between ‘haves’ and ‘have nots’. Consequently, India distanced itself from the resulting treaty. However, not being a party to the NPT has in no way diluted India’s non-proliferation commitment, which is second to none. Some Western commentators have referred to India, which has a strict export control regime in place, as a classic example of a non-proliferator. My question is, if all States with nuclear weapons adopted a ‘no first use’ policy, would that not be a step towards universal nuclear disarmament?

R. GOTTEMOELLER (United States of America): As regards your reference to ‘haves’ and ‘have nots’, I would recall that the emphasis of universal compliance is on a balance of obligations — every country, regardless of whether it possesses nuclear weapons, has an obligation vis à vis the norm of non-use of nuclear weapons. We hope in this way to de-emphasize the gap between ‘haves’ and ‘have nots’.

As regards India’s ‘no first use’ policy, I believe that the whole ‘no first use’ idea should be revisited with a view to nuclear risk reduction.

W. STERN (USA): From Mr. Flory’s presentation I gained the impression that he might be advocating a revision of the Code of Conduct on the Safety and Security of Radioactive Sources. In my view, it is too soon to talk about revising the Code of Conduct — the ink is hardly dry.

J. LOY (Australia): I agree with you, my impression was that Mr. Flory was thinking in terms not of revising the Code of Conduct but of converting it into a convention. In my view, the focus now should be on implementing the guidance contained in the Code of Conduct. At the IAEA International Conference on the Safety and Security of Radioactive Sources due to take place in Bordeaux from 27 June to 1 July 2005, there will be an opportunity to review the progress being made as regards implementation of that guidance. Perhaps in a few years’ time there could be a follow-up conference, which might give consideration to revising the Code of Conduct.

K. OZAKI (Japan): The Convention on the Physical Protection of Nuclear Material (CPPNM) is likely to be amended in the near future, and the amended version of the CPPNM may well overlap with the Suppression of Nuclear Terrorism convention that is being negotiated at United Nations Headquarters, New York. What are Mr. Flory's views regarding the possibility of an overlap?

D. FLORY (France): The revised version of the CPPNM will likely not contain the word 'terrorism', but it will certainly be applicable to acts that can be described as terrorist acts. Therefore, there may be an overlap. However, the Suppression of Nuclear Terrorism convention negotiations in New York are currently at a standstill, and I think we should use the opportunity offered by the proposed amendment of the CPPNM to strengthen the physical protection of nuclear material and facilities pending progress in those negotiations.

W. RUDISCHHAUSER (Germany): In order to secure nuclear and other radioactive material you must know where it is and in what quantities. What is being done to establish inventories of such material?

R. GOTTEMOELLER (USA): Our government has published an inventory of the United States' plutonium stocks, and I recently saw a press report indicating that an inventory of its high enriched uranium stocks is expected to be published soon. Many countries are taking some actions, but clearly there is much more to be done.

L.D.S. GUIMARAES (Brazil): In her presentation, Ms. Gottemoeller spoke about preventing the acquisition of uranium enrichment capabilities by additional States. Does Ms. Gottemoeller have in mind a temporal baseline for determining which States would be 'additional'?

R. GOTTEMOELLER (USA): We recognize that the idea of preventing the acquisition of such capabilities by additional States is a controversial one, but I would recall that most States which have contemplated their acquisition had ultimately decided, on economic grounds, not to construct uranium enrichment facilities of their own but to purchase nuclear fuel on the open market — with a view to returning the spent fuel to the suppliers. They would then have them deal with the spent fuel.

A.J. AL KHATIBEH (Qatar): From discussions which we have had during the past two years with the IAEA Office of Nuclear Security, I have the impression that it has no clear vision as regards the training of people such as customs officials.

T. TANIGUCHI (IAEA): As I said in my Session 2 presentation, the IAEA is providing a number of training courses at both the national and the regional level for customs officers and border guards.

While I have the floor, I should like to mention my concern about the fact that non-State actors seem, with the help of modern information technology, to be networking more effectively than States. I should like to see IAEA Member States networking more closely with us in addition to strengthening national and regional infrastructures for protecting against nuclear terrorism.

EFFORTS TO STRENGTHEN NUCLEAR SECURITY IN MEMBER STATES

(Session 4)

Chairperson

D. REHIR
Malaysia

STRENGTHENING NUCLEAR SECURITY: A CANADIAN PERSPECTIVE

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1. INTRODUCTION

Before the terrorist attacks in the United States of America on 11 September 2001, physical protection measures for nuclear facilities and nuclear material in Canada were based on international recommendations, modified to account for the Canadian social, cultural, economic and political environment.

The security environment after 11 September dramatically changed the Canadian approach to nuclear security. The Canadian Nuclear Safety Commission (CNSC), the nuclear regulator for Canada, has taken the necessary steps to strengthen nuclear security to reflect the current threat risks to Canada and its nuclear facilities and material.

2. OVERVIEW OF THE FRAMEWORK FOR STRENGTHENING NUCLEAR SECURITY IN CANADA

In enhancing nuclear security in Canada, the CNSC adopted a multiphased, risk informed approach in assessing the security of facilities, nuclear material and radioactive substances. Building on relevant studies identifying potential internal and external threats as well as identifying areas vital to Canadian nuclear installations, the CNSC designed an approach to ensure that the level of security is commensurate with the risks posed by the facility and/or material. In Canada, this led to a three phase approach.

2.1. Phase I: Critical infrastructure

Through the issuance of an Emergency Order under the provisions of the Nuclear Safety and Control Act (NSCA), major nuclear facilities were instructed by the CNSC in the immediate aftermath of the terrorist attacks in the USA to initiate enhanced security measures at their sites. Major nuclear facilities include nuclear power plants and major nuclear research facilities. The measures required of these facilities, which continue to be in place, include:

(a) Immediate, on-site armed response available 24 hours a day, seven days a week;
(b) Enhanced security screening of employees and contractors, involving background, police and security checks;
(c) Protection against forced vehicle penetration with the addition of vehicle barriers;
(d) Improved physical identification checks of personnel utilizing card access and biometric devices;
(e) Searching of personnel and vehicles, utilizing explosives detectors, X ray screening and metal detection equipment, among others.

2.2. Phase II: Other nuclear installations

The CNSC then completed a second phase of its security review. As a result of the analyses carried out, the CNSC informed its licensees of a second tier of nuclear facilities (e.g. uranium refineries, mills and fuel fabricators) of the security measures to be enhanced at their facilities and the terms of a vulnerability assessment that they were to conduct. Some of the security enhancements took effect immediately, while others were gradually implemented. Physical protection enhancements for these facilities included:

(a) Enhanced security screening of employees and contractors, involving background and police checks;
(b) Implementation of measures to prevent and detect unauthorized access into the facility;
(c) Formalized arrangements with off-site response forces;
(d) Development and implementation of a supervisory awareness programme.

For this phase of facilities, the CNSC continues to review vulnerability assessments and liaises closely with licensees on the implementation of corrective measures at licensed facilities.

2.3. Phase III: Other facilities as well as nuclear substances and radioactive sources

The third phase of the security review continues, and will eventually cover all 4500 licensees of the CNSC. For each class of licensee, the review includes:

(a) Examination of the current state of security;
(b) Assessments to determine whether existing measures are adequate;
(c) Recommendations for improvement, with a follow-up assessment by the CNSC.

3. PREVENTION: IMPORTANT FIRST LINE OF DEFENCE

In the traditional cycle of deterrence, prevention, mitigation and response, the CNSC has attached significant importance to prevention. Prevention is also a key element in Canada's National Security Policy, which forms an important basis for the safety and security of Canadians. In terms of the CNSC's approach to nuclear security, prevention includes not only the protective measures outlined above but also the modernization of legal frameworks, including domestic regulations and international instruments, education and training, and effective partnerships with relevant domestic and international entities.

4. FUTURE CHALLENGES

The CNSC is committed to implementing its regulatory activities in order to manage current and future strategies for nuclear security. In doing so, it intends to balance appropriate opportunities for international coordination and cooperation against sovereign national responsibilities for nuclear security.

5. CONCLUSION

The CNSC's overall nuclear security strategy, which includes risk informed approaches to regulating nuclear installations and material, is key to achieving our overarching goal, which is to protect health, safety, security and the environment and to respect Canada's international commitments on the peaceful use of nuclear energy.

For more information on the CNSC and its nuclear regulatory activities, please visit http://www.nuclearsafety.gc.ca

THE SECOND LINE OF DEFENCE IN THE RUSSIAN FEDERATION

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One of the most dangerous forms of terrorism is nuclear and radiological terrorism, including threats by terrorists to use so called dirty bombs. The Russian Federation's national security concept recognizes the possibility of a terrorist threat arising in practically any sphere of State activity. The threat of nuclear or radiological terrorism is considered an integral part in the overall problem of ensuring national security.

Without doubt, reliable physical protection of nuclear material and a reliable system of accounting for and control of nuclear material and radioactive substances play a key role in preventing and countering possible acts of nuclear and radiological terrorism. Clearly, however, the problem of combating the manifestations of nuclear and radiological terrorism cannot be solved by physical protection measures alone.

Considering that the whole threat of nuclear and radiological terrorism is conditional upon the possibility of illicit trafficking in nuclear material and radioactive substances and their illegal possession or transport in a State's territory, across its customs boundaries or in transit across its territory, national systems for responding to the threat of terrorism must be designed as an informational and logical whole integrated with the system for combating illicit trafficking in nuclear material and radioactive substances.

Generally speaking, the term 'second line of defence' refers to the set of measures to combat illicit trafficking in nuclear material and radioactive substances at the next level above the nuclear facility. This level can be the territory of a country or its border.

The 'second line of defence and countermeasures against nuclear and radiological terrorism' means coordinated actions taken by federal bodies of the executive power whose functional duties include the prevention of terrorist acts in general, and by law enforcement bodies, ministries, departments and organizations directly concerned with the use of radioactive material and substances or providing security during their storage and use. The system must have a central competent body for taking prompt decisions in assessing the degree of potential threat and adopting preventive measures. This then makes it possible to coordinate the work of these systems at the international level.

The State system for countering nuclear and radiological terrorism must be based on the national system for countering illicit trafficking in nuclear material and radioactive substances. These must be combated jointly, using all cost effective means and methods.

Work is being done at the Federal Atomic Energy Agency (Rosatom) on establishing a conceptual profile and basic technical systems solutions for the creation of a State system for preventing and countering illicit trafficking in nuclear material and radioactive substances. The informational and logical unity of the structure of data generated and used in solving the problems of physical protection, accounting for and control of nuclear material, and countermeasures against nuclear and radiological terrorism is to be preserved. During this work the main forms of activity and interaction of the federal bodies of the executive power, ministries, departments and organizations are being determined.

The principal aim of creating the State system is to ensure comprehensive control of the transport of nuclear material and radioactive substances in the country's territory, across its customs boundaries and in transit across its territory, the discovery of cases of illicit trafficking in nuclear material and radioactive substances, and the conveyance of seized nuclear material and radioactive substances to a temporary storage location and temporary storage until a decision has been made as to their confiscation and disposition.

In a joint initiative of Rosatom with the Russian Ministry of Internal Affairs, Federal Security Service and Ministry of Foreign Affairs, and involving other concerned ministries and departments, draft provisional regulations for the State system for countering illicit trafficking in nuclear material and radioactive substances in the territory of the Russian Federation and on its State borders have been drawn up.

The draft regulations contain the main conceptual elements for organizing the fight against illicit trafficking in nuclear material and radioactive substances and establishing in the Russian Federation a State system that will bring together and organize the activities of the principal law enforcement and customs bodies, ministries and departments dealing with nuclear issues and other concerned organizations involved in the joint combating of illicit trafficking in nuclear material and radioactive substances. The draft also lays down the main tasks and functions of these ministries, departments and organizations, primarily with regard to the prevention of possible criminal uses of nuclear material and radioactive substances.

We are aware that creating a national system for countering illicit trafficking in nuclear material and radioactive substances is a complex and multifaceted problem. In this connection a decision has been taken at the federal level to start work on setting up, as of 2005, a pilot scheme as a prototype element of the national system for countering illicit trafficking in nuclear material and radioactive substances. Practical experience with operating it will make it possible to formulate a concept (system profile) aimed at ensuring security from the threat of nuclear and radiological terrorism.

It is proposed that the pilot scheme should comprise all informationally interacting technically equipped checkpoints on major transport routes (road, rail and sea) and all subdivisions of law enforcement bodies at typical locations of mass congregation of people (airports, railway stations, etc.), provided with special radiation monitoring equipment and a permanently functioning operations centre (information and analysis centre).

Given the specific nature of radioactive material and substances, an important part of establishing the State system for countering illicit trafficking in nuclear material and radioactive substances is to develop radiation measuring instruments for the search, detection and identification of radioactive material and substances and to equip the structural components of the system with them. For this purpose we consider it useful in the first instance to produce vehicle based mobile radiation monitoring laboratories and handheld instruments in a concealed design for detecting nuclear material and radioactive substances. During the trial operation, mobile laboratories will make it possible to monitor most of the motorways, while handheld detectors will be supplied to the law enforcement bodies responsible for security at locations of mass congregation of people (airports, railway stations, etc.).

Analysis of likely scenarios for action of the structures in charge of detecting illicit trafficking in radioactive material has shown that equipment for the following purposes needs to be provided:

- Instruments for detecting nuclear material and radioactive substances;
- Instruments for searching for and locating nuclear material and radioactive substances;
- Instruments for identifying nuclear material and radioactive substances.

Taking into account the requirements imposed on the executive authorities by the special features of the tasks to be carried out, and to ensure the necessary prompt responses, the instruments must be of the following types: mobile, portable and concealed.

Another important element of the second line of defence is prevention of the illicit transfer of nuclear and other radioactive material across the Russian border. Detecting and preventing the illicit transfer of nuclear and other radioactive material across borders is an extremely important component of an overall strategy aimed at not allowing these materials to fall into the hands of terrorists or criminal groups supporting them. Moreover, the conditions at borders differ significantly from those at nuclear facilities or at reprocessing or disposal facilities for these materials.

On the one hand, border checkpoints are nodes where flows of people, goods and means of transport come together, therefore 100% checking is possible at such places. On the other hand, border control structures must not hamper foreign trade or the movement of individuals for legitimate reasons, therefore the time that border control procedures may take is limited.

In the Russian Federation the function of preventing the illicit transfer of nuclear material and radioactive substances across the border lies with the customs service. This function was assigned to the customs service in 1995.

The customs control system for nuclear material and radioactive substances in the Russian Federation was developed along the following lines:

— Development of special instruments for the control of nuclear material and radioactive substances, adapted to the general technology of customs controls;
— Development of regulatory documents and control technologies;
— Equipping checkpoints and internal customs terminals with special radiation monitoring apparatus;
— Training of personnel, including instruction in special programmes.

The Russian Federation's customs service uses various types of radiation monitoring system at checkpoints. The main systems are stationary radiation monitors for the control of individuals, baggage and postal items and for the control of motor vehicles and trains.

To achieve effective organization of the response by customs personnel to detection signals, the radiation monitoring systems have been reinforced with video observation systems. The information from these combined systems is gathered in joint response stations (automated workplaces). For the purposes of searching for, locating and identifying nuclear material and radioactive substances contained in a detected object, and also to maintain radiation safety, portable instruments are used.

As already pointed out, a fundamental role in detecting illicit transfers of nuclear material and radioactive substances is played by radiation monitors. The Russian stationary monitors used by the customs service are fully in line with IAEA recommendations and have two detection channels — gamma and neutron — which ensures that they are effective, in particular in detecting special nuclear material. The sensitivity characteristics of the system have been verified on actual nuclear material in multiple trials, both in the Russian

Federation and in national laboratories in the United States of America. These radiation monitors have also undergone successful testing under the joint IAEA–Austrian Government Illicit Trafficking Radiation Detection Assessment Programme (ITRAP).

In establishing the State system for the prevention and countering of illicit trafficking in nuclear material and radioactive substances, special consideration was given to setting up a full scale information system on matters related to combating illicit trafficking in nuclear material and radioactive substances, including a number of departmental and central databases. In setting up such systems the Russian side also thinks it is useful to propose considering the possibility of combining efforts and coordinating the activities of interested parties.

It must be realized that illicit trafficking in nuclear material and radioactive substances poses a serious threat to the international community. The situation now is such that it is necessary to develop bilateral and multilateral international relations to coordinate measures for the prevention and countering of acts of nuclear and radiological terrorism. International cooperation in countering nuclear and radiological terrorism is an objective necessity. In this area there are problems requiring united international efforts and coordination of activities. Accordingly the Russian side proposes at the present stage combining the efforts of the Russian Federation and other interested parties, in particular IAEA Member States, with the aim of dealing with the tasks ahead.

It is understood that the main difficulty in solving the problems lies in establishing and perfecting national systems. However, the problems are urgent and require resolution without delay. Completion of the second line of defence in the Russian Federation is considered one of the most important preventive measures in combating nuclear and radiological terrorism.

I would like to thank the staff members of the Atombezopasnost company, A. Morozov and V. Kovalchuk, and also N. Kravchenko and D. Danko of the Russian Federal Customs Service, who gave me much help in preparing this paper.

NUCLEAR SECURITY AT MAJOR PUBLIC EVENTS: LESSONS LEARNED FROM THE 2004 ATHENS OLYMPIC GAMES

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Abstract

Greece attributes the highest priority to security issues and in particular to issues related to nuclear and radiological security, and in this context shares the experience gained during the organization of the Athens 2004 Olympic Games. In light of the exceptional circumstances arising from hosting the Athens Olympics and from recent major security concerns internationally, there was a clear need for a nuclear security programme in Greece to prevent, detect and respond to the threat of nuclear terrorism. As a result, an unprecedented cooperation started between the IAEA, the United States Department of Energy and a number of Greek authorities under the coordination of the Greek Atomic Energy Commission. This comprehensive programme adopted a multiarea coverage of nuclear and radiological security, including physical protection of nuclear and radiological facilities, prevention of smuggling of radioactive material across borders, prevention of dispersion of radioactive material in Olympic venues, enhancement of emergency preparedness and response to radiation incidents, and extensive training of hundreds of persons belonging to several organizations involved in radiological and nuclear security.

1. INTRODUCTION

The Olympic Games returned to their homeland last summer. Greece had to face many challenges, security being a predominant one, since the Olympic Games 2004 was the first major athletic event organized after the moment when terrible terrorist actions became a part of our everyday life.

In this context, an unprecedented operation was organized by Greece to secure the 2004 Olympics. As part of this effort, a comprehensive plan was put in place by the Olympic Games Security Division of the Hellenic Ministry of Public Order to address nuclear, radiological, biological and chemical (NRBC) threats. Consequently, a multifaceted cooperation started in May 2003, when the Greek Atomic Energy Commission (GAEC) proposed collaboration between the IAEA and the Greek Government in the field of nuclear safety and security, with the view to ensure a high level of radiological protection during the Athens 2004 Olympic Games. This cooperative effort greatly contributed to the success and security of the Games.

In this challenging endeavour the major participants were the IAEA, the United States Department of Energy (USDOE) and several national organizations in Greece; the GAEC was responsible for coordination and had overall responsibility for the completion and sustainability of the project.

The GAEC is now sharing the experience gained, in order to assist other countries in their efforts to secure major public events.

2. THE NUCLEAR SECURITY PROJECT DURING THE 2004 ATHENS OLYMPIC GAMES

In order to achieve the full and successful deployment of security measures during the Olympic Games and to maintain a high level of nuclear and radiological security beyond the Games, official agreements between partners were signed, significant national funding was devoted and continuous technical and scientific support and training were planned.

The project adopted a multiarea coverage in order to leave no gaps in nuclear and radiological security; this was the first time in the world that such a full scale approach to nuclear and radiological security was implemented to protect a major international event. In the following paragraphs the basic axes of this project are presented.

2.1. First line of defence

The first line of defence aimed at the physical protection of nuclear and radiological facilities in order to prevent the theft or sabotage of radioactive material that had already been used or was stored in the country.

This project, coordinated by the GAEC, had three parts:

(a) In collaboration with the Demokritos National Centre for Scientific Research and the Ministry for the Environment, a programme started in 2002 aimed at the collection of unused radioactive sources in the country. More than 700 radioactive sources (^{60}Co, ^{137}Cs, ^{90}Sr, ^{241}Am, ^{57}Co, ^{57}Kr, etc.) used in research, medical or industrial laboratories with a total activity of 1.4 TBq, and ten radiotherapy sources (^{60}Co and ^{137}Cs) with a total activity of 113 TBq, were collected and then exported for recycling.

In the same framework, the national waste management facility was significantly upgraded.

(b) Under the auspices of the IAEA and in the framework of the USDOE international safeguards programme, the physical protection system of the research reactor was upgraded beyond the requirements of INFCIRC/225. This upgrade included a new perimeter detection system, the installation of a new closed circuit television system using the latest state of the art charge coupled device night vision cameras, new main and backup lighting schemes and a new security control room.

(c) Under the USDOE Radiological Threat Reduction programme and in collaboration with Sandia National Laboratories, the physical protection of radiological material in Greece was enhanced. In particular, the physical protection systems of radiological installations in 22 hospital clinics and in a major industrial facility were strengthened.

2.2. Second line of defence

The second line of defence aimed at preventing radioactive material from being smuggled into the country. The GAEC, in collaboration with the IAEA and the Greek Customs Office, and under the US Second Line of Defense programme, applied state of the art technology at borders to detect illicit trafficking of radioactive or nuclear material. Specifically, 57 portal monitors and 456 pieces of handheld equipment were provided at 32 cargo and passenger entry points to the country, covering seven airports, 12 seaports and 13 land borders. The fixed systems contain gamma and neutron detectors. The handheld equipment is used for secondary control in places where fixed systems are installed, or for primary control at smaller entry points. These sets of equipment are composed of radiation pagers indicating the presence of radiation, gamma detectors to determine the radioactive source location and intensity, and spectrometers to specify the radionuclide.

2.3. Third line of defence

The third line of defence aimed at preventing dispersion of radioactive material in an Olympic venue. Radiation monitoring at venues was performed prior to and during the Olympic Games. More specifically:

(a) Radiation monitoring to find hidden strong sources in Olympic Games installations, including the Olympic village, was performed 1–2 days before the start of the Games, using specialized equipment (large volume NaI portable spectrometers, plastic scintillation detectors, radioisotope identification devices, radiation pager alarms). Moreover, the measurement results were used as background signals for surveys that followed during the Games.

(b) Radiation monitoring at the entry points of the Olympic venues was performed continuously, in order to detect any attempts to bring radioactive material into the venues. This was achieved by permanently placing radiation pagers next to metal detectors at the gates of the venues, and by providing radiation pagers or personal radiation detectors to the security officers. In total 181 detectors and 32 identification systems were used for this purpose. During the big events the officers were assisted by GAEC scientific staff. A large number of the false alarms that occurred were due to persons who had undergone nuclear medicine examination or treatment procedures; these persons were provided with certificates issued for this purpose.

2.4. Emergency planning and response

According to its statutory role, the GAEC is responsible for emergency preparedness, advises the government on the measures and interventions necessary to protect the public and acts as the contact point for receiving information and communicating it to the emergency response systems. Since its establishment, it has participated in the Xenokratis National Emergency Plan for Civil Protection; moreover, during the Olympic Games the GAEC participated in the NRBC threat emergency plan coordinated by the Olympic Games Security Division. According to this plan, the GAEC's staff participated 24 hours a day for three months in the Crisis Management Support Group, in the response team and in the support team. The response team acts in hot and warm zones for on-scene monitoring, in zone determination and in identification and measurement of radiological contamination, issues radiation protection recommendations, and is involved with radioactive source recovery, dosimetry and decontamination supervision. In order to accomplish its tasks the following actions were realized:

(a) Collaboration with IAEA experts: scientists from the Commissariat à l'énergie atomique (CEA) in France visited the GAEC twice and provided advice and recommendations on the upgrade of its emergency response system.

(b) Infrastructure upgrading — provision, collection, checking, calibration and classification of:
   (i) Measurement and detection systems (detectors, surveys, dosimeters, contamination monitors, portable spectrometers, pagers, etc.);

(ii) Protective equipment;
(iii) An independent communications system;
(iv) A mobile laboratory fully equipped with a series of detectors, spectrometers, protective equipment and a radiochemical laboratory.
(v) A specialized vehicle to collect radioactive sources.

(c) Development of a scientific library containing all recent publications relevant to nuclear and radiological safety and security.
(d) Provision, adaptation and prior use of dispersion calculation codes (Lasair, Hotspot, Hysplit).
(e) Documentation of all the procedures to be followed step by step in the event of an emergency.
(f) Training and exercises.
(g) Recruitment of additional staff.

2.5. Cooperation

This was a large scale cooperation project between several organizations. Apart from the major partners already mentioned, the GAEC was involved with the following:

(a) Intensifying links with European and international organizations, emergency response systems and databases (ECURIE, IAEA Illicit Trafficking Database, ENATOM, etc.).
(b) Creating a network of collaborating laboratories at Greek universities or research centres countrywide; provision of training, equipment (hand-held detectors) and additional staff so as to be able to deal with an emergency in a location away from Athens.
(c) Through the Olympic Games Security Division, linking with more than 50 national organizations. Extensive cooperation in the area of intelligence between the partners helped the radiological emergency system become more efficient and effective.
(d) Staff participation in several committees, working groups, meetings, exercises and visits related to emergency response and planning.

2.6. Training

Aiming at the creation of a mechanism so that the persons involved in this project were trained to pursue their duties effectively, three paths were followed:

(a) Experts from the CEA provided training on emergency response issues to the GAEC, so as to create a nucleus for the dissemination of such knowledge in the country.
(b) Customs personnel were trained at the Hammer training facility in Richland, USA, and Pacific Northwest National Laboratories provided training to over 400 personnel in Greece.
(c) Organization of or participation in training programmes that included more than 3000 persons from the fire brigade, the International Airport of Athens, the Olympic Games Security Division, the customs service, radiological installations and the network of collaborating laboratories, as well as first responders, medical physicists and medical personnel from the main hospitals.

2.7. Sustainability

Greece attributes great importance to the sustainability of this project, so as to ensure continuously and globally a high level of radiological protection (including safety and security) in the country. For this reason, the Greek Government contributed significant national funds to the programme. All the Greek authorities involved have the appropriate personnel and technical infrastructure to support the programme. Furthermore, the GAEC contributed its knowledge to ensure a smooth operation of the systems in the future. More specifically, the GAEC has undertaken the responsibility of continuous training of customs officers, law enforcement officers and first responders, and provision of additional equipment to various authorities and institutions, as well as maintenance of the equipment used by the customs service and the calibration of all radiation detectors.

3. LESSONS LEARNED FROM THE 2004 ATHENS OLYMPIC GAMES

The lessons learned from organizing the nuclear and radiological security of the 2004 Athens Olympics are categorized by three major aspects: organizational, technical and training. It should be pointed out that while planning the emergency measures related to radiological security, one must have in mind that the effects of dispersion of radiological material are mostly psychological and economic and not a massive loss of life. Despite this fact, there is a substantial probability that decision makers will cancel a major event such as the Olympic Games in the event of a radiological incident.

3.1. Organizational aspects

The following lessons concerning organizational aspects were learned:

(a) Close coordination and cooperation between all partners is critical.
(b) Strong political leadership from a lead agency in the host country is necessary to move the project forward.
(c) International and local expertise must be combined in the design and implementation of such a project.
(d) The combined threat (radiological, chemical and biological) should be accounted for in the emergency planning and response, as well as in training.
(e) The existence of adequate, trained and well informed personnel with a clear assignment of responsibilities is a prerequisite. Moreover, efforts should be made to keep well trained personnel in place and ensure knowledge dissemination.
(f) Time is always a crucial factor that must be taken into consideration for all activities (planning, contract negotiations, purchase of equipment, acceptance tests, installation, training, etc.).
(g) When introducing or implementing changes in facilities or procedures, the stakeholders and the personnel involved must be well informed and their opinion must be taken into consideration.
(h) Even if the goal is a near term event such as the Olympic Games, it is important to plan for the long term. It is crucial to develop a plan for the sustainability of the system over time and the transition of full ownership and operation to the host country. Moreover, use of the equipment after the event must be investigated (redistribution, leasing, etc.).
(i) Illicit trafficking intelligence provided by the IAEA to the Greek authorities proved to be a critical element in the evaluation of the overall terrorist threat to the Olympic Games, particularly in conditions characterized by the limited time available for decision making.

3.2. Technical aspects

The following lessons concerning technical aspects were learned:

(a) During major events both the threat level and the consequences of threats may be significantly higher than the norm. For this reason, the adequacy of the security systems, even if they meet current international recommendations, should be reassessed.

(b) When installing physical protection systems in radiological installations such as hospitals, special emphasis must be made in order to ensure the functionality of the system without disturbing the proper duties of the staff (e.g. the operation of both access control and alarm systems proved highly impractical).
(c) Potential adverse consequences of sabotage are reduced by shutting down critical installations (e.g. reactors) during significant periods of the event.
(d) Countries that have entered into bilateral cooperation agreements, have installed and effectively used equipment, and have broadly enhanced border security can assist, through regional leadership, other countries in benefiting from such installations.
(e) Special provisions must be taken for the prevention and handling of false alarms and their possible consequences.
(f) In the event of an alarm, the key point is to localize quickly the person at a checkpoint, not in the crowd.
(g) Radiation detection can be integrated with standard security equipment.
(h) The optimum positioning of detectors at the entrance of the venues is one pager on the belt of the security officer and one pager under the tray, not ignoring X ray flashes and electromagnetic interference, and overnight removal and redeployment of pagers.
(i) The speed and effectiveness of quickly detecting an anomaly is enhanced if the naturally occurring radioactive material spectra for the region are catalogued and software tools and expertise to handle and evaluate many spectra are available.

3.3. Training

Training is crucial; it is impossible to overestimate its importance. Equipment is useless if people do not know how to use it effectively. Initial training as well as ongoing refresher training is necessary to ensure that the system works. The most important recommendations concerning this issue are:

(a) Cooperative teamwork is essential, since experts with different backgrounds contribute to the project.
(b) A comprehensive, phased plan taking into account different stages and different categories of staff (specialty, tasks, etc.) should be created.
(c) Timely and convincing information to address concerns on radiation and chemical and biological agents should be provided.
(d) Theoretical and practical training on radiation, instrument usage and procedures, scheduled well in advance, should be provided.

(e) Documentation should be available on time.
(f) Established plans should be adhered to, in order to bring everything together at the right time: equipment, procedures, training facilities, materials, trainers and trainees.
(g) Exercises demonstrating the cooperation of different authorities, based on a national response plan, and small scale exercises for personnel within a single authority, should be carried out.
(h) Instrument training materials should be purchased.

4. CONCLUSION

Greece demonstrated its commitment to assigning the highest priority to security issues, and in particular to nuclear and radiological security, in its organization of last summer's very successful Olympic Games in Athens. These games were among the most secure in the history of the Olympics. Our wish is to see other countries enhancing nuclear security, and we believe that this unprecedented cooperation project provides a model for this purpose.

The comprehensive conclusions drawn from the successful implementation of security measures at the Athens Olympic Games 2004 are now available for assisting countries in their efforts to secure major public events in the future. Assistance could be provided through the Greek Centre for Security Studies, which has been established for this purpose following the Olympic Games. The GAEC is the contributor to this centre for nuclear and radiological security issues.

ACKNOWLEDGEMENTS

Greece wishes to express its gratitude to its partners in this challenging endeavour, specifically to the IAEA for its significant contribution to the programme as an important technical adviser and as an effective and efficient coordinator of our cooperation with the Member States involved, to the USDOE for its invaluable support of the programme and to all other countries that helped us organize a secure Olympic Games.

DISCUSSION

E.S. LYMAN (United States of America): The US Department of Energy has apparently revised its design basis threat twice since 11 September 2001, partly in response to concerns about the threat of improvised nuclear devices, particularly at certain facilities where there are large inventories of high enriched uranium (HEU).

There is a large amount of HEU at Canada's Chalk River facility. I was wondering whether Canada had taken account of the improvised nuclear device threat when developing its protection strategy for that facility.

L.J. KEEN (Canada): We have carried out a complete nuclear security assessment of the Chalk River facility. As regards HEU, Canada cooperates closely with the USA, from which it imports HEU for targets for the production of radioisotopes.

E.S. LYMAN (USA): Given the possibility of a successful terrorist attack on the Indian Point nuclear power plant, followed by the exposure of people — especially children — to radioactive iodine, has New York City's Office of Emergency Management considered predistributing potassium iodide tablets — especially to schools?

E. GABRIEL (USA): That is one of several measures which New York City's Department of Health is currently considering as part of our overall emergency preparedness efforts.

A. DJALOEIS (Indonesia): Were there any incidents of nuclear security significance at the 2004 Summer Olympic Games despite the precautions taken?

L. CAMARINOPOULOS (Greece): No — only false alarms.

I. GORINOV (Bulgaria): Could Mr. Gabriel say a few words about the experience of New York City's Office of Emergency Management with ionizing radiation detectors?

E. GABRIEL (USA): Over 20 000 people in the USA — police officers, fire fighters, emergency management service workers and so on — carry handheld detectors, which are worn at the waist. These detectors are not very useful, however, as they constantly give false alarms due to, for example, the detection of radiation from persons undergoing medical procedures that use radioisotopes.

As regards portal detectors, vehicles carrying medical radioisotopes frequently trigger them. The vehicles have to be taken off the road and their papers examined, in order to determine whether there is a threat. That is a huge human resources problem. People from Brookhaven National

Laboratory are trying to adjust our portal detectors so that there is a higher probability of their detecting only certain radioisotopes.

A. NILSSON (IAEA): Mr. Gabriel referred to false alarm problems with ionizing radiation detectors. In helping Member States to establish detection systems at their borders, we have encountered such problems. In addition, we have found that many of the people using radiation detectors have difficulty in interpreting the readings.

For some years the IAEA has had a coordinated research project designed to facilitate the selection of radiation detectors, and a project report will be issued soon.

We have come to realize the importance of the acceptance testing of radiation detectors when they come from the manufacturer — often they simply do not work. For the acceptance testing, one needs people with a scientific background able to interpret the detector readings. Such people can also train customs officers, border guards and so on in the interpretation of detector readings and assist them if they still have problems.

Detectors that work properly, people who have been well trained to use them and scientific back-up are all essential for an effective radiation protection system. Having a system which one believes to be effective but in reality is not is worse than having no system at all.

Besides those elements, one needs coordination with different entities both within one's own country and in other, particularly neighbouring, countries.

E. GABRIEL (USA): Together with the US Department of Energy and the Department of Homeland Security, we are currently conducting a programme through which we hope to determine what radiation detection equipment we should buy in future. At the same time, the federal government is working on the question of standards for such detectors.

S.D. SAGAN (USA): In his presentation, Mr. Gabriel focused on mitigation of the consequences of terrorist attacks. What about the prevention of such attacks?

E. GABRIEL (USA): I focused on mitigation largely because mitigation exercises attract more media attention. We certainly carry out prevention exercises, but they do not make for such dramatic pictures as mitigation exercises.

S.D. SAGAN (USA): Mr. Gabriel, how do you decide on your exercise scenarios?

E. GABRIEL (USA): We generally base our exercises on what the intelligence community is advising us what it believes to be the current thinking of terrorists. For example, we carried out an exercise at Shea Stadium, postulating a large explosion there; a few weeks later there was a large explosion, causing a number of injuries, at another stadium. Incidentally, we expanded the original scenario for that exercise by placing suspicious looking packages in a couple of vehicles near the Shea Stadium and calling on the US Department of Energy to find the dirty bombs.

Also, we base exercises on events like the 11 March 2004 attacks on the Madrid transit system and the sarin attacks on the Tokyo transit system.

The organizers of emergency response exercises frequently overlook hospitals, but we try to involve many of the 50–60 hospitals in and around New York City in all of our exercises.

S. FERNÁNDEZ MORENO (Argentina): I believe that nuclear security culture should go hand in hand with nuclear safety culture. What has the Canadian Nuclear Safety Commission (CNSC) done in the area of nuclear safety culture as a result of the increasing concerns about nuclear security?

L.J. KEEN (Canada): Even before 11 September 2001 nuclear safety culture in Canada had a security component, and we do not think that there are two cultures — one for nuclear safety and one for nuclear security. For example, a Canadian consultant to the IAEA on nuclear safety culture has also been doing some work in the nuclear security area. However, hiring security personnel and integrating them is a major task.

S. FERNÁNDEZ MORENO (Argentina): How often does the CNSC review design basis threats?

L.J. KEEN (Canada): Design basis threats are under constant review, in the light of information from intelligence agencies, of technological developments and of changes in the nature of the work being done at different facilities.

P. SHAW (United Kingdom): Most radiation accidents have not been accompanied by an explosion — people have simply fallen ill with symptoms that have gone unrecognized for some time. The same could happen in the case of a terrorist attack involving radioactive material but no explosion or shootout. Does New York City's Office of Emergency Management have some way of ascertaining that such an attack has taken place?

E. GABRIEL (USA): Yes, our 'syndromic surveillance system', which has been in place since 1998 and enabled us, for example, to identify West Nile disease in the New York City region, is programmed to identify diseases associated with overexposure to ionizing radiation. It has been proposed that the system be converted into a nationwide system.

REGIONAL AND INTERNATIONAL COOPERATION

(Session 5)

Chairperson

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CREATION OF THE EUROPEAN NUCLEAR SECURITY REGULATORS ASSOCIATION (ENSRA)

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The security[1] of nuclear material and nuclear facilities against acts of theft or sabotage by groups or individuals has long been a matter of national and international concern. Since the second half of the 1990s an informal group of European governmental authorities and public bodies involved in nuclear security regulation, control and expertise has been meeting to share their views and experience in their field of competence. In view of the increased importance attached to the security of nuclear material and nuclear facilities, they have decided to formalize their existence and to create an informal association of governmental authorities and agencies having regulatory or advisory responsibilities for civil nuclear security. The name of this association is the European Nuclear Security Regulators Association (ENSRA).

The objective is to create a suitable forum for confidential exchanges on nuclear security regulatory matters, in particular within Europe, to establish a mutual professional capability to examine how nuclear material and nuclear facility security issues are developed and how related measures are implemented, to develop a comprehensive understanding of the Fundamental Principles of Physical Protection of Nuclear Material and Nuclear Facilities[2], and to achieve or promote as far as practicable a common approach of nuclear security practices within countries in Europe having civil nuclear programmes and industries.

Although responsibility for developing and maintaining a comprehensive physical protection system for nuclear material and nuclear facilities within a State rests entirely with the government of that State, the need for

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[1] Nuclear security: The prevention and detection of and response to theft, sabotage, unauthorized access, illegal transfer or other malicious acts involving nuclear material or its associated facilities.

[2] Fundamental Principles of Physical Protection of Nuclear Material and Nuclear Facilities: see http://www.iaea.org/worldatom/Programmes/Protection/inf225rev4/rev4_content.html

international cooperation becomes particularly evident in situations in which the effectiveness of physical protection in one State depends on the actions taken by other States. In addition, the opportunity to share best practices in physical protection would be of mutual benefit to all members.

A key point equally shared by many countries is the reference to a set of fundamental principles of physical protection developed under the auspices of the IAEA. In this field, practices and knowledge emerge from the experience and cultural context specific to each country. Fundamental joint views are, however, noted, and deal with philosophical, legal, organizational and technical aspects leading to the implementation of a national system of physical protection for nuclear material and nuclear facilities.

By having exchanges of information and experience on physical protection practices taken or to be taken within the country of each ENSRA member, one of the first tasks of ENSRA will be to promote a common approach to physical protection, taking into account the fundamental principles of physical protection.

ENSRA was created in a meeting held in Madrid on 28 October 2004. The members of ENSRA at this date are the:

— Federal Agency for Nuclear Control (FANC), Belgium;
— Radiation and Nuclear Safety Authority (STUK), Finland;
— Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU), Germany;
— Ministry of Economy, Finance and Industry, France;
— Institute for Radiological Protection and Nuclear Safety (IRSN), France;
— Ministry of Industry, Tourism and Commerce (MITyC), Spain;
— Nuclear Safety Council (CSN), Spain;
— Swedish Nuclear Power Inspectorate (SKI), Sweden;
— Federal Office of Energy (BFE), Switzerland;
— Department of Trade and Industry (DTI), United Kingdom.

ENSRA has the following objectives :

— To form a suitable forum for exchanges on nuclear security regulatory matters capable of addressing confidential issues;
— To establish a mutual professional capability to examine how nuclear material and nuclear facility security issues are developed and how related measures are implemented;
— To develop a comprehensive understanding of the Fundamental Principles of Physical Protection of Nuclear Material and Nuclear Facilities;

— To achieve or promote as far as practicable a common approach of nuclear security practices within Europe, recognizing the continuing need for variation between States to reflect different national circumstances.

Membership is by invitation by the current membership only and is restricted to governmental authorities and associated, government nominated, public bodies with regulatory or advisory responsibilities for civil nuclear security arrangements in European States with domestic civil nuclear programmes and industries. The views expressed by individual representatives of ENSRA member organizations do not necessarily reflect those or the policy of their government.

REGIONAL PARTNERSHIPS FOR MUTUAL ASSISTANCE

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Abstract

Regional partnerships have been established in many parts of the world as part of nuclear cooperation and to ensure that nuclear knowledge, standards and expertise are shared between countries. These partnerships have been promulgated in Asia by the IAEA and through the Forum for Nuclear Cooperation in Asia for many years. Australia has supported these partnerships, particularly in safety and safeguards, as a means of ensuring control over nuclear material and the safe use of nuclear technologies. The increasing focus on security after 11 September 2001 has provided an opportunity to expand these networks to share knowledge and expertise in the security of nuclear and radioactive material, and to act collaboratively. This paper considers the value of such partnerships and, in particular, discusses work funded by the Australian Government to enhance security in the Southeast Asia region. One of the challenges in regional partnerships in this region is that, due to the region's diversity, each country, national organization or user may have quite different methods and varying levels of resources to achieve successful outcomes.

1. REGIONAL PARTNERSHIPS IN NUCLEAR ENERGY

Regional partnerships exist in a number of geographical areas and are promoted by the IAEA, the Forum for Nuclear Cooperation in Asia (FNCA) and groupings of countries. In the South Asia region they include the Regional Co-operative Agreement for Research, Development and Training Related to Nuclear Science and Technology (RCA) and the FNCA, in addition to smaller regional groupings established for specific purposes. The advantages of these partnerships and agreements have been:

(a) Addressing the common needs of the countries involved and thus facilitating programmes based on recipient requirements rather than donor assumptions;

(b) Allowing sharing of expertise, not only from developed to developing countries but also stimulating technical cooperation between developing countries;
(c) Meeting regional needs from regional resources and experience;
(d) Engendering a common sense of responsibility for issues that need regional commitment in order to ensure high standards of operation or applications of best practice in regulation.

The RCA consists of the 17 Member States of the IAEA in East, Southeast and South Asia, while the FNCA consists of the nine countries in East and Southeast Asia that are signatories to the Treaty on the Non-proliferation of Nuclear Weapons.

Some successes in the RCA have included the establishment of regionally focused approaches to training courses, the understanding and measurement of pollution, and medical capability development. Australia has contributed around $7 million to RCA projects.

2. REGIONAL PARTNERSHIPS IN NUCLEAR MATERIAL CONTROL

In the area of nuclear safeguards, regional partnerships have been important in promoting adherence to international standards for the control of nuclear material and in sharing training in developing State systems of accountancy and control (SSAC). They are also effective in promoting the importance of, and methods for implementing, Additional Protocols. Such partnerships are between relevant State authorities and allow an open exchange of information. Australia has been holding regional focused SSAC courses since the mid-1980s; the last one was in 2004, while the next is due in 2008.

In addition to this suite of courses, Australia is keen to promote universalization of the Additional Protocol and consequently provides direct support and assistance to countries in its region in their efforts to sign, ratify and implement this protocol. Australia has provided in-country assistance on the Additional Protocol as part of a formal programme since 2002, including assistance to Indonesia, Malaysia, the Philippines and Thailand, with future assistance planned for Singapore and Vietnam. Wherever possible, this assistance, provided by the Australian Safeguards and Non-proliferation Office (ASNO), is conducted in conjunction with the IAEA and other donor States with an interest in the region, most prominently the United States of America and Japan. Australia concluded an agreement with the US Department of

Energy (USDOE) to work together on safeguards outreach in the Asia–Pacific region.

Funding for this work has been made available by the Australian Agency for International Development (AusAID), by the IAEA from extrabudgetary funds and by ASNO from its regular budget.

In February 2004 Australia hosted a training course in Sydney on the security of nuclear research facilities. The course was jointly conducted by ASNO, the IAEA and the US Sandia National Laboratories. This course was the first of its kind anywhere in the world, focusing on the security of research facilities and radioactive sources, and is part of a worldwide effort to secure and protect nuclear material and facilities from theft, sabotage and terrorism.

Twenty-one nuclear regulatory and facility officials from Australia, China, Indonesia, Malaysia, the Philippines, the Republic of Korea, Thailand and Vietnam participated in the two week course together with lecturers from Australia, Germany, the IAEA, Indonesia and the USA.

3. THE NEED FOR REGIONAL PARTNERSHIPS FOR SOURCE SECURITY

The history of regional partnerships is a good foundation on which to build future interactions. They allow developed and developing countries to share resources and expertise, they can be more firmly focused on regional needs and they can gain ownership within the participating countries if they are seen as mutual assistance and not as the imposition of views from outside. Primarily they build on networks that have been established and on trust that has been built up over years of previous interactions.

Outside assistance is, of course, a vital ingredient because it can bring a range of experience, common standards and access to expert advice that may not be available within the region. In the case of the IAEA, technical cooperation, safety and safeguards are clearly part of the mandate, and Australia has sought to work with or through the IAEA in regional initiatives. The challenge is to put together these aspects in a coordinated way that allows eventual ownership of the processes and solutions within the region.

Issues associated with the security of nuclear and radiological material are primarily State responsibilities, and the role of the IAEA is less well defined here than in nuclear safety, although guidance on the physical protection of nuclear material exists. However, international cooperation is an essential element in combating a global threat, and the efforts of the IAEA are clearly vital in building on existing mechanisms for training and assistance. In this area, more than in many others, what happens in one State may affect another. Loss of control over such material, illicit trafficking in nuclear material or the existence of orphan sources increases the risk in other countries. Cooperation therefore remains the key to establishing a globally effective control regime and the most effective means to remediate situations where loss of control exists, or potentially exists.

Given the range of expertise available in various regions and the precedent for regional groupings of countries to work together, regional partnerships are an ideal way to tackle the growing threat of nuclear or radiological terrorism in the region. These partnerships can be founded on the learning that arises from previous regional initiatives.

I turn now to radioactive sources. Within Southeast Asia there is extensive use and transport of radioactive sources, with ongoing economic development ensuring continuing and growing use. As elsewhere, the countries of the region are not immune to radioactive sources becoming uncontrolled. For example, there was an incident of accidental overexposure and deaths from an uncontrolled medical radiotherapy source in 2001 [1], a case of illegal possession and attempted smuggling of ^{137}Cs in 2003 [2] and a theft from a steel company in October 2000 of 25 radioactive sources, which remain unaccounted for [3]. The region also has experienced terrorist activity, and has a geography characterized by thousands of islands and extensive coastlines, which presents a major challenge to enforcing regulatory, police and border control. As in all parts of the world, the threat of radiological terrorism arising from uncontrolled or poorly controlled radioactive sources in Southeast Asia requires efforts that are coordinated at the international, regional and national levels.

Without any specific agreed standard governing the security of radioactive sources, the IAEA's Code of Conduct on the Safety and Security of Radioactive Sources [4], as revised in 2003, is the most relevant international, albeit non-legally binding, instrument. However, of the 70 countries which wrote to the IAEA Director General by 10 January 2005 to advise that they were working towards following the guidance contained in the Code, only three were from the Southeast Asia and South Pacific region (Australia, New Zealand and the Philippines). It appears that other regional countries are working to understand the Code's objectives and requirements more fully and better resource their regulatory capacity and capability before committing to the Code. A regional partnership for countries to support and assist each other in this regard will enable them to make such a commitment at an earlier date than may otherwise have been the case. Importantly, a successful partnership would ensure that efforts to improve and maintain source safety and security are not unnecessarily duplicated, and that common issues are dealt with consistently and expeditiously.

Internationally, the USA, through the USDOE's International Radiological Threat Reduction (IRTR) initiative and associated programmes, has provided a focus for identifying and implementing specific measures for improving source security, with, for example, Indonesia and the Philippines benefiting from physical security upgrades under this US programme. The USA is also fostering regional partnerships as a means of utilizing all available resources to expeditiously address security concerns.

The IAEA's long standing Action Plan for the Safety and Security of Radioactive Sources and its 2003 update [5] have been one of the means for IAEA Member States to obtain advice, training and assistance for their national source safety and security programmes. The IAEA Director General has stated support for the coordination of relevant activities using regional partnerships: "It is clear that the benefits of IAEA assistance — and the reach of our limited resources — can be maximized by coordinating our activities with other international and regional organizations and through the use of regional partnerships" [6].

4. SOUTHEAST ASIAN REGIONAL SECURITY OF RADIOACTIVE SOURCES PROJECT

While providing support for regional partnerships as a general policy direction, the Australian Government was particularly mindful of the security threat and the international recognition of the value of regional partnerships when it funded the Australian Nuclear Science and Technology Organisation (ANSTO) in May 2004 to lead a three year regional project to enhance the appropriate security of radioactive sources and, consequently, to ensure the continuing benefits of proper source utilization. The Regional Security of Radioactive Sources (RSRS) project has a wide scope that includes the technical, administrative and regulatory aspects of security associated with the management[1] of dangerous[2] radioactive sources. The project's regional scope covers 11 Southeast Asian countries, including seven IAEA Member States (Indonesia, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam) and four current non-Member States (Brunei, Cambodia, East Timor

[1] Management means the administrative and operational activities that are involved in the manufacture, supply, receipt, possession, storage, use, transfer, import, export, transport, maintenance, recycling or disposal of radioactive sources [4].

[2] Dangerous radioactive sources means those defined as Category 1, 2 and 3 in Ref. [7].

and Laos). A companion programme covers the South Pacific Island States, including Papua New Guinea. A complementary project to address Australian national source security activities is being implemented by the Australian regulator, the Australian Radiation Protection and Nuclear Safety Agency.

The RSRS project's objective for Southeast Asia is to prevent, or to minimize the probability and impact of, unauthorized access or damage to, or loss, theft or unauthorized transfer of, radioactive sources by:

(a) Assisting countries in the region to identify, and to secure, orphan and poorly controlled radioactive sources;
(b) Improving the security arrangements for radioactive sources through sustaining improvements to regulatory infrastructure and user practices and advice on physical and equipment upgrades.

Cooperation and collaboration is occurring with government authorities in all regional countries, with the IAEA and with the US IRTR programme. Several planning and consultation meetings with participants from Southeast Asian countries, the USDOE and the IAEA have been conducted since the Australian project's initiation in June 2004. These meetings were aimed at both (i) providing the participating countries with an understanding of the objectives and capacities of the RSRS project, the IAEA Action Plan for the Safety and Security of Radioactive Sources and US IRTR programmes, in order to seek opportunities to harmonize approaches and activities, and (ii) identifying regional and national activities and future needs. Emphasis has been placed on country self-assessment, with peer review and evaluation identifying practical needs and actions to improve and sustain the appropriate control and security of radioactive sources throughout their life cycle.

5. CHALLENGES

The RSRS project outcomes are primarily concerned with ensuring that the relevant practical knowledge and experience — the 'how to' — is transferred to, and implemented sustainably in, all Southeast Asia (and in the South Pacific in the companion programme). Owing to the region's diversity, each country, national organization or user may have quite different methods and varying levels of resources to achieve successful outcomes. In a regional sense, the RSRS implementation programme is providing the impetus for countries to share their practical knowledge and propose appropriate solutions to the common issues being faced in source security. A range of methods that take account of regional diversity is being employed. These include establishing and maintaining information and coordination networks, holding practical regional training courses and technical workshops, developing and peer reviewing national documents, including by adapting available information on model source security standards or regulatory inspection and user requirements, and peer reviews of regulatory and user practices during technical assistance activities and expert missions.

In establishing the regional source security partnership for Southeast Asia, the factors and challenges being addressed include:

(a) Managing the implications for regional cooperation that arise from the fact that national action plans and programmes for radioactive source security contain sensitive information and are rightfully the responsibility of national authorities to develop, implement and maintain.
(b) Striving to avoid unnecessary overlap or duplication of programmes regarding radioactive source security, through communication and coordination of plans and activities of all stakeholders with complementary programmes and objectives (such as the IAEA, the US IRTR and regional countries).
(c) Optimizing the efforts of the pool of expertise available through careful scheduling of regional or national activities.
(d) Prioritizing activities based on the participants' needs, managing the possibly limited expertise available and recognizing that there is a range of other important activities involving similar personnel from the region.
(e) Recognizing, respecting and managing cultural and language differences to facilitate and encourage identification and sharing of source security issues and experience and using an information network of expertise and contacts to address needs and requirements as they arise.

6. FUTURE DIRECTIONS

A number of issues arise as to the future directions for regional partnership projects. These include:

(a) The need to continue to build on the networks, trust and goodwill that exist.
(b) The recognition that, for global threats, regional partnerships provide local implementation of international guidance and probably should be considered the norm for such implementation rather than the exception.

(c) Avoidance of overlap with other initiatives by careful planning and communication as a continuing requirement to ensure effective use of resources.
(d) The goal to ensure sustainability of the achievements in all countries and to develop mutual assistance that will last over the long term.
(e) The need to consider whether current international agreements, such as the Code of Conduct, are sufficient. A number of Member States seek more specific guidance on establishing a security system, and there is insufficient guidance at this level. Following a period of gaining experience, decisions should be made on what further guidance is needed and whether a more binding international agreement is warranted.
(f) Regional source security partnerships, which offer the opportunity for extension to security of other facilities and other areas, for example research reactors and waste stores, while recognizing the constraints of confidentiality of information.

In conclusion, adopting global standards and effective local implementation are crucial in combating threats to all countries. Working collaboratively, openly and with serious intent in regional partnerships allows countries to participate in a focused way, while addressing clearly the specific problems in the region. Australia encourages all countries to be involved.

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INTERNATIONAL COOPERATION IN NUCLEAR SECURITY STRENGTHENING IN KAZAKHSTAN

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1. INTRODUCTION

Kazakhstan is one of three Eurasian countries and has a territory of 2 717 300 km^2 bordering China and the central Asian republics of the former Soviet Union in the south and the Russian Federation to the north, east and west. Geographically, about 18% of Kazakhstan territory is in Europe, between the Ural and Volga Rivers. The country has a very low population, about 16 million in 2004, living in several populated areas around industrial centres.

1.1. Uranium industry

Kazakhstan has a developed uranium mining industry in the form of the National Mining Company, a company of the Kazatomprom National Atomic Company holding. The holding also operates the main shares of a joint stock company, the Ulba metallurgical plant, which has a fuel fabrication plant producing nuclear fuel pellets for Soviet designed reactors such as the water cooled, water moderated power reactor and the high power channel type reactor. The Ulba metallurgical plant is situated in Ust-Kamenogorsk, one of the industrial cities in eastern Kazakhstan close to the Altay region.

1.2. Nuclear research

The National Nuclear Centre of the Republic of Kazakhstan has two institutes operating research reactors, namely the Institute of Atomic Energy in the city of Kurchatov[1], eastern Kazakhstan, which has three reactors — the IGR, a pulse graphite reactor, the IWG-1M, a modified high temperature

[1] Kurchatov is the centre of the former Semipalatinsk nuclear test site, where most of the Soviet nuclear weapon tests were carried out.

reactor that originally was designed for a gas coolant and was later modified to use a water cooling system, and the RA, which is a high temperature hydrogen cooled reactor operated as a full scale prototype of a space propulsion nuclear engine. Now that the latter reactor has been shut down, nuclear fuel is being unloaded from the reactor core and shipped to the Russian Federation.

Near Almaty, the former capital of the country, in Alatau, the Institute of Nuclear Physics operates the pool water cooled research reactor VVR-K of 10 MW(th) power capacity, which is being used for scientific research in nuclear physics and some applications in the production of different radiation modified polymers and radiopharmaceuticals, for radiation treatment of materials and for other applications. Recently the Kazakhstan Government decided to establish a Centre of Nuclear Medicine, based on the Institute of Nuclear Physics.

All three research reactors operated in the two institutes of the National Nuclear Centre have fuel made of high enriched uranium (HEU). In addition, for some research and application programmes the institutes are using HEU bulk materials.

1.3. Nuclear energy

In western Kazakhstan is the first industrial scale fast breeder reactor, BN-350, which began operating in 1973 in Shevchenko, now renamed Aktau, in Mangistau oblast on the eastern shores of the Caspian Sea. The reactor was successfully operated by the Mangyshlak Nuclear Power Company up to its shutdown in April 1999 by a decision of the Government of Kazakhstan. When the reactor was shut down its decommissioning programme was launched with the support of an international team of specialists. General coordination of the reactor decommissioning programme is carried out under the auspices of the IAEA. Included in the decommissioning of BN-350 are several important projects, for example the safe draining and further management of the sodium coolant and the safe and secure management of the reactor spent nuclear fuel. The spent nuclear fuel assemblies and blanket assemblies contain HEU and plutonium, which gives a basis for the special arrangements for the security measures in the reactor decommissioning programme.

2. INTERNATIONAL PROGRAMMES

In 1993 began the first coordinated plan of the IAEA for technical assistance to Kazakhstan in the establishment and enhancement of a State system of nuclear material accountancy and control and of physical protection of nuclear facilities. Several donor countries and IAEA experts provided very useful and timely assistance to the newly established Kazakhstan Atomic Energy Agency (KAEA[2]) and to various nuclear facilities in the country to develop the basic elements of a State system of nuclear safety and security. The United Kingdom Department of Trade and Industry provided direct technical assistance to the KAEA, and the Swedish Nuclear Power Inspectorate helped to develop the first Kazakhstan regulations, norms and provisions in the field of the peaceful use of atomic energy and provided several training courses and scientific visits for personnel of Kazakhstan's nuclear facilities and regulatory authorities. The bulk of the technical support was provided by the US Department of Energy (USDOE), the US Nuclear Regulatory Commission and the Government of Japan.

The main focus of the IAEA coordinated plan of technical assistance was the effective application of safeguards in Kazakhstan, but much was also done in the nuclear security field. The situation in Kazakhstan at that time was complicated by the presence of a large Soviet nuclear weapons arsenal, which was later dismantled and successfully transferred to the Russian Federation. This process was completed in 1995.

Also, there was, and still remains in some sense, the problem of the former Semipalatinsk test site. After the separation of Kazakhstan from the Soviet Union there was a remaining nuclear device on this site, which presented a unique problem in its safe and secure management on the territory of a non-nuclear-weapon State. As is well known, Kazakhstan declared its non-nuclear-weapon status immediately after independence and signed a set of international documents confirming its non-nuclear-weapon commitments, such as the Lisbon Protocol in 1992, the Treaty on the Non-proliferation of Nuclear Weapons in 1993, the safeguards agreement in 1994, enforced in 1995, and others.

In 1995 practically all remaining problems were solved. The nuclear device on the test site was eliminated, destroyed by conventional explosives without the possibility to recover any material or information on the device's design. All nuclear warheads were dismantled and shipped to the Russian Federation, and missiles and launcher silos were destroyed. About 600 kg of HEU was transferred from the Ulba metallurgical plant to the USA for safe

[2] The KAEA was established as an independent agency under the direct control of the Government of Kazakhstan. Later the KAEA was included into the administrative structure of the Ministry of Science and New Technologies and recently into the Ministry of Energy and Mineral Resources. The KAEA has been renamed the Kazakhstan Atomic Energy Committee (KAEC).

and secure storage in Operation Sapphire. Nuclear HEU fuel from the RA reactor, together with some HEU material, was shipped to the Russian Federal Nuclear Centres from the Institute of Atomic Energy.

Later there were several projects related to nuclear security and safeguards; for example, volumetric and seal control systems were designed and constructed for the Ulba metallurgical plant under the TACIS programme, and the USDOE supported the development of an internal compliance system for this facility under its nuclear export control assistance programme.

Assistance is being provided to Kazakhstan in several areas, including the development and upgrading of a legal and regulatory basis, training of personnel of nuclear and other facilities having nuclear activities, strengthening of the infrastructure of the State system for control of nuclear material, and organization and implementation of training exercises in nuclear security. The control of nuclear material includes accountancy systems at the facility and State level, State control of nuclear exports and imports, and systems for combating the illicit trafficking of nuclear material.

3. CONTROL OF RADIOACTIVE MATERIAL AND SOURCES

It should be mentioned that the KAEA has from the very beginning given consideration to the control of radioactive material, owing to its danger to the population and the environment. The State system for nuclear control therefore includes aspects not only related to nuclear material but to radioactive material in general. More focus has sometimes been given to radioactive material, since historically this was less controlled than nuclear material.

One of the problems that the KAEA faced was the problem of orphan sources. During the transition period in the early 1990s there was a gap in the registration of sources, which was previously performed by the sanitary and epidemiology services of the Ministry of Health together with special departments of the Ministry of Interior Affairs. Also, many organizations that had radioactive sources in their inventories disappeared. Some organizations did not report their sources to the Kazakhstan authorities, since during the Soviet era they were under so called ‘union level operation’. All these problems led to the decision of the government to define the KAEC as the authority responsible for the control of radioactive sources.

With support from the IAEA and several donor organizations, the KAEC began a programme for recovering information on lost sources. The US Nuclear Regulatory Commission supported the development of software and regulations for the National Registry of Sources of Ionizing Radiation, the

USDOE provided technical assistance in enhancing the physical protection of strong sources used in medical organizations, the IAEA–USA–Russian Federation trilateral initiative has in Kazakhstan the task of securing the storage of two strong irradiators at the National University, and the USDOE together with the Department of Defence are planning training courses in searching for and recovery of lost sources. With support of the IAEA and donor countries the KAEC has developed a national strategy for the recovery of regulatory control of orphan sources.

The USDOE is also supporting the development of technical measures for radiation control at the borders of Kazakhstan. An agreement has been signed between the USDOE and the Customs Committee of the Kazakhstan Ministry of Finances on a programme for the supply of equipment and training of the customs officers foreseen to use this equipment. These measures of the second line of defence should markedly enhance the effectiveness of the State system for combating illicit trafficking of radioactive material, including nuclear material.

4. DEVELOPMENT OF PROGRAMMES

In general, the assistance programmes are developing from ad hoc solutions to the urgent problems of newly established systems of State control of nuclear activities in the country to systematic assistance on building a State nuclear security infrastructure. In this process, coordination of international assistance programmes is becoming the most important part of the work, providing effective and efficient assistance and excluding possible duplication of the projects of different donors and the State itself.

It is also very useful to have periodically an independent assessment of a State's nuclear security system and of the infrastructure in general or of its parts, with development of detailed reports on the system status and recommendations on further upgrades. This work can be done under the auspices of the IAEA through its system of services in nuclear security.

The experience of Kazakhstan shows that international assistance programmes and international cooperation are very useful for a country developing its nuclear security system, especially in the early stages of this work, since effective use of the experience and knowledge of developed countries substantially speeds up development of a State system of nuclear security, and strengthens its effectiveness and efficiency.

5. CONCLUSION

International assistance programmes have provided an effective and rapid development of the national nuclear security system in Kazakhstan. Valuable experience has been transferred in organization, methodology, legal and regulatory infrastructure and personnel training, and there has been direct technical assistance in the supply of equipment and in other hardware upgrading.

NUCLEAR SECURITY IN INDONESIA — NATIONAL AND INTERNATIONAL COOPERATIVE EFFORTS: LESSONS LEARNED

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Abstract

This paper gives a brief description of the nuclear energy activities in Indonesia from the perspective of nuclear regulatory control, focused on nuclear and radiological security. Starting with a short description of the overall nuclear energy landscape of the country, the paper continues to discuss the situation and the challenges connected with nuclear and radiological security. The adopted solution strategy is described and the programme of activities is briefly elaborated upon. Finally, the results so far achieved, lessons learned and some concluding remarks are presented.

1. INTRODUCTION

In my view, this international conference on nuclear security is not only very important, but also quite timely, especially in the light of the increasing risks of terrorist activities worldwide. From our own experience in Indonesia, for example, the terrorist bomb attacks in Bali and several other locations in our country have not only inflicted a great deal of suffering on the victims and their relatives but have also produced a terribly negative socioeconomic, psychological and political impact on our country. It is thus self-evident that the explosion of a dirty bomb could produce far worse effects than those conventional chemical bombs that have been used so far.

In this paper I am going to share with you how we view the situation in Indonesia, with a special focus on nuclear and radiological security, how we endeavour to meet the security challenges through national and international cooperative efforts, and what lessons we have learned from the experience.

2. NUCLEAR ENERGY CONTROL IN INDONESIA

Activities towards the acquisition, development and utilization of nuclear science and technology were triggered in Indonesia by the explosion of atomic bombs in the South Pacific by the French Government in the mid-1950s. Focused initially primarily on monitoring and assessing the impact of the radioactive fallout from the aforementioned nuclear explosions, nuclear activities and national capability in nuclear science and technology have grown significantly in Indonesia since then. Nowadays, natural and radioactive isotopes as well as radiation techniques are widely used in the fields of agriculture, health care, industry and the environment. It should be noted that considerable progress has also been achieved in scientific research and technology development activities, as well as in the preparation of the necessary regulatory framework and infrastructure, in an effort to prepare the country for the safe and secure introduction of nuclear power.

2.1. Basic national strategy

As a developing country and party to the Treaty on the Non-proliferation of Nuclear Weapons (NPT), Indonesia pursues its nuclear activities in accordance with its three-pronged basic national strategy, namely:

(a) Development and utilization of nuclear science and technology. The task and authority to promote nuclear scientific research and technology development, disseminate the use of nuclear technology and strengthen the national capability are delegated to the National Nuclear Energy Agency (BATAN) and the State owned company PT BATAN Teknologi (BATEK).

(b) Nuclear energy control. The task of nuclear energy control from the point of view of nuclear and radiological safety and security as well as safeguards is delegated to the Nuclear Energy Regulatory Agency (BAPETEN). BAPETEN is authorized to formulate the necessary rules and regulations and is responsible for the enforcement of these through licensing and inspection.

(c) Nuclear energy awareness. BATAN and BAPETEN, in collaboration with associated government agencies and other interested partners, act as the spearhead for public information campaigns to achieve a satisfactory degree of public awareness of the benefits and risks of nuclear energy.

2.2. Objects under nuclear regulatory control

The physical objects that fall under the nuclear regulatory control of BAPETEN can be classified into two broad categories:

(a) Nuclear installations and material. These include the three research reactors, namely Triga-2000 (2000 kW) in Bandung, Kartini (150 kW) in Yogyakarta and RSG-GAS (30 MW) in Serpong (West Java). Located in the Serpong nuclear research complex are in addition the EFEI (Experimental Fuel Element Installation for power reactors), FEPI (Fuel Element Production Installation for research reactors), RWI (Radioactive Waste Installation), RMI (Radio Metallurgical Installation) and RPI (Radioisotope Production Installation).

(b) Radiation installations and radioactive material. Belonging to this category are facilities in about 3000 hospitals, about 1000 industrial plants and several tens of training and educational centres, all scattered over the Indonesian archipelago.

2.3. Major national challenges

There are three major national challenges currently faced in connection with the regulatory control of nuclear energy in Indonesia. These are described briefly as follows:

(a) Introduction of nuclear power. Based on previous activities and the recent studies carried out by BATAN in collaboration with the IAEA and other associated agencies in Indonesia, it is currently envisaged that the first nuclear power plant will be in operation in Indonesia in 2015–2016. Taking this assumption into account, and allowing for about five years for construction and two years to settle the necessary contracts and legal, technical–administrative and financial matters, BAPETEN has come to the conclusion that all regulatory framework, infrastructure and human resources for the proper nuclear and radiological regulatory control of safety and security associated with nuclear power introduction will have to be in place by the end of 2008. In view of the present situation, this constitutes a formidable challenge for BAPETEN.

(b) Radiation safety and radiation protection. In a poor developing nation, in particular since the country was hit by the financial and economic crisis of 1997, BAPETEN finds it extremely hard to keep a reasonable balance between the rigorous enforcement of the IAEA International Basic Safety Standards for Protection against Ionizing Radiation and for the

Safety of Radiation Sources and the provision of adequate health services to the general public. BAPETEN, through its limited means, does its best to provide consultation and assistance to those hospitals and other radiation installations that are still in need of improvement in their radiation safety, radiation protection facilities and management. In such a large archipelago, consisting of over 13 000 islands extending more than 5000 km from the western to the eastern tips, ensuring adequate radiation safety and radiation protection for the 3000 hospitals in Indonesia constitutes another enormous challenge for BAPETEN in the next few years.

(c) Nuclear and radiological security. Last but not least is the challenge associated with the strengthening of nuclear and radiological security in Indonesia. This is described below.

3. NUCLEAR AND RADIOLOGICAL SECURITY IN INDONESIA

The relative simplicity of constructing a dirty bomb by putting radioactive substances as an additional component of a conventional chemical bomb, and the relatively high frequency of bomb explosions in Indonesia, presumably perpetrated by radical individuals or groups, coupled with the potential catastrophic consequences of such explosions, have caused BAPETEN to make the strengthening of nuclear and radiological security in Indonesia one of its top priority programmes.

3.1. The problem

Strengthening of nuclear and radiological security basically implies taking the necessary measures to minimize the probability of, prevent the occurrence of, and carry out precautionary actions to mitigate the subsequent damage of, malicious acts involving attacks or sabotage to nuclear or radiation installations or misuse of nuclear and radioactive material. In the case of nuclear and radiation installations, such measures are directed towards providing adequate protection from attacks. In the case of nuclear and radioactive material, the ultimate objective is to provide cradle to grave security, so that it is well protected from irresponsible hands.

Before the measures described below were taken, the situation with respect to nuclear and radiological security in Indonesia could be summarized as follows:

(a) Protection of vital objects. Nuclear and radiation installations with nuclear and radioactive material in Indonesia were generally inadequately protected. Design basis threats were not seriously considered, and attempts to improve physical protection were not on the agenda of activities, primarily due to lack of resources.
(b) Indonesia — a large archipelago. Geographically, Indonesia is a beautiful archipelago located in the tropics, consisting of over 13 000 emerald green islands with over 80 000 km of coastline. It connects two oceans, the Indian and the Pacific, and two continents, Australia and Asia. However, such a blessing makes the country quite vulnerable from the security point of view. With these thousands of islands, many of which are still nameless and uninhabited, the country is a haven for clandestine activities of radical groups, including illicit trafficking of nuclear and radioactive material.
(c) National resources and capability. National resources and capability to minimize threats to nuclear and radiological security, and to adequately respond to associated incidents, are still far from adequate. The reason is twofold. First, as a poor developing country, Indonesia is faced with many other pressing problems that require immediate attention; nuclear and radiological security is important, but with a far lower priority. Second, apart from the inadequacy of financial resources, even awareness of the problem among decision makers needs to be developed and/or strengthened.

3.2. Solution strategies

Considering the gravity of the problem and complexity of the situation, BAPETEN has adopted a basic set of strategies as follows:

(a) Problem solving/risk reduction measures. The highest priority focus is placed on actual problem solving activities with the motto ‘learning by doing’. Such activities are integrated as far as possible with the development of human resources and scientific–technical support facilities. The programme of activities includes:
   (i) Physical protection of nuclear installations;
   (ii) Strengthening of the security of radiation installations and radioactive sources;
   (iii) Searching for and rescue of lost or orphan sources;
   (iv) Combating illicit trafficking of nuclear and radioactive material.
(b) Development of national capability. Development of national capability is conducted in collaboration with the relevant government agencies and

other associated organizations. Highest priority is placed on the development of:

(i) A national emergency preparedness and incident response system;
(ii) Competent and dedicated human resources;
(iii) Scientific–technical support.

(c) Development of national and international cooperation networks. Pooling of national resources constitutes an important component of the strategy. International cooperation is essential for technology transfer and scientific–technical expert support. National partners include, among others, BATAN, POLRI (national police force), BIN (national intelligence agency) and several government departments and ministries (Research and Technology, Transport, Foreign Affairs, Trade and Industry). International partners include Australia (Australian Nuclear Science and Technology Organisation, Australian Safeguards and Non-Proliferation Office and Australian Radiation Protection and Nuclear Safety Agency), the IAEA and the United States of America (Department of Energy (USDOE)). In addition, efforts are being undertaken to build a regional network in nuclear and radiological security and safeguards.

3.3. Activities and results

Despite all the difficulties faced in designing programmes with appropriate priorities and in planning activities based upon the available indigenous and foreign resources, the progress achieved so far has been very encouraging.

(a) Problem identification, analysis and solution studies. A series of successful expert missions has been conducted with the help of international partners and arranged by the IAEA:

(i) International Physical Protection Advisory Service (IPPAS) mission (2001);
(ii) International SSAC Advisory Service (ISSAS) mission (2003, 2004);
(iii) International Nuclear Security Advisory Service (INSServ) mission (2004);
(iv) Emergency Preparedness Review (EPREV) mission (2004).

(b) Problem solving activities. A series of problem solving activities has been successfully conducted with the assistance of international partners and the USDOE:

(i) Reshipment of nuclear spent fuel from Indonesian research reactors (2004);

   (ii) Strengthening of the physical protection of Indonesian nuclear installations (2004);
   (iii) Strengthening of the security of radioactive sources and radiation installations in Indonesia (2004);
   (iv) Combating illicit trafficking of nuclear and radioactive material through seaport monitoring (in progress).

(c) Capacity building activities. A series of capacity building activities has been conducted with the assistance of international partners, the IAEA, the USDOE and Australia:
   (i) Task orientated scientific visits of Indonesian senior personnel to foreign agencies/facilities;
   (ii) Task orientated training and education courses for Indonesian scientific–technical staff members;
   (iii) Provision of equipment by international partners.

   In my view, capacity building constitutes an essential factor for the sustainability of the programme on a long term basis.

4. LESSONS LEARNED AND CONCLUDING REMARKS

A lot of effort, in particular during the past two years, has been made to strengthen nuclear and radiological security in Indonesia. The challenges are enormous, and national resources are still far from adequate, but thanks to the positive attitude of partners at both the national and international levels, encouraging results have been obtained. There is still a long way ahead, but the start has been promising.

Some of the lessons learned may be summarized as follows:

(a) National awareness and political will. These factors play a key role for the success of the endeavour. The relevant government agencies have to be made aware of the importance and urgency of the problem, so that they not only appreciate it but also participate actively in finding and implementing the solution.

(b) Scope of the problem. It was soon realized that, for the case of Indonesia, the problems associated with nuclear and radiological security are too big to handle, and in most cases extend beyond the national boundaries. Thus effective solutions do not seem achievable without successful national and international collaboration.

(c) Sustainability. The sustainability of the programme needs a strong national commitment and capability. International assistance should be regarded by the recipient country as help for self-help; the recipient countries concerned should ensure the development of a national capability based upon indigenous resources.

Finally, let me at this point, on behalf of BAPETEN and Indonesia, express my sincere appreciation and thanks for the assistance, collaboration and friendship that have been extended to Indonesia by Australia, the IAEA and the USA during the course of the international cooperation.

DISCUSSION

A.J. AL KHATIBEH (Qatar): I should like to see the IAEA approaching regional cooperation in relation to the security of nuclear material and radioactive sources through some mechanism similar to its Model Projects for Upgrading Radiation Protection Infrastructure.

A. NILSSON (IAEA): The IAEA Office of Nuclear Security, which attaches great importance to regional and subregional cooperation in the nuclear security area, is contemplating the establishment of such a mechanism.

There are a number of mechanisms that it wishes to establish, but it has been in full operation for only a few years, and their establishment will take a fair amount of time. However, we are well advanced in our thinking, as I shall show in my presentation to be made in the next session.

S.B. ELEGBA (Nigeria): Is the regional cooperation under way in the southern Pacific region taking place within the framework of the Regional Cooperation Agreement for Research, Development and Training Related to Nuclear Science and Technology (the RCA for IAEA Member States in Asia and the Pacific region) or of the Association of South-East Asian States (ASEAN) or within some other framework?

R.F. CAMERON (Australia): We see it as taking place within the framework of the IAEA's plan of activities to combat nuclear terrorism, and we are trying to ensure that it is well coordinated with the IAEA activities in question and also with the activities under way within the framework of the Global Threat Reduction Initiative. To that end, we have signed a memorandum of understanding with the IAEA and concluded an agreement with the United States of America.

N.P.J. McCANN (Ireland): I am speaking in my personal capacity, as a director of a research and campaigning initiative called Nuclear Free Earth, and I realize that most of — or even all of — the participants in this conference will disagree with what I have to say.

In my view, if what is known now about the effects of nuclear fission had been known some 100 years ago, the global community would not have embarked on the journey which has brought us to where we are now, with so many nuclear security problems. Accordingly, I wonder why this conference is not considering how activities that have given rise to those problems might be reduced.

J. MacNAUGHTON (United Kingdom): That is a legitimate question, but we are currently considering the issue of regional and international cooperation in combating the threat of nuclear terrorism.

A. DJALOEIS (Indonesia): As someone from a developing country, I believe that of the three pillars of the NPT —non-proliferation of nuclear weapons, nuclear disarmament and the peaceful utilization of nuclear energy — the third is the most important. In my view, much effort and money has been invested in nuclear safeguards and security, and the international community should provide the IAEA with more money for promoting the development and application of nuclear energy for peaceful purposes. Instead of the Global Threat Reduction Initiative, there should be a 'global trust and respect initiative'.

We have been talking about terrorists who would like to acquire nuclear weapons and not about why they wish to do that — the despair that drives them to extreme acts. This is something that the world should be focusing on.

C.R. STOIBER (USA): We have a number of international instruments relevant to nuclear security — for example the NPT, the Code of Conduct on the Safety and Security of Radioactive Sources and the Convention on the Physical Protection of Nuclear Material. However, the national legislation relevant to their implementation is uneven — there are countries, like the USA, with highly developed (perhaps even overdeveloped) legislation and countries with little or no legislation. The result is inconsistent implementation of such international instruments by different countries.

Accordingly, I should like to see the IAEA doing still more to harmonize the nuclear security related laws and regulations of different countries than it has done in the past through legislative assistance missions.

In the past, the IAEA has — perhaps for good reasons — been unwilling to develop a model national law on nuclear security, but I believe, in the light of experience gained through participation in IAEA legislative assistance missions, that the IAEA should now develop such a model law or at least an outline of one — not necessarily to be incorporated word for word into national legislation, but in order to present principles, concepts and approaches which States might draw on in evaluating their own legal systems and perhaps making them more consistent with the legal systems of other States.

R. GOTTEMOELLER (USA): In his presentation Mr. Zhantikin described, inter alia, the contributions of the IAEA and the USA and other countries to the rapid strengthening of nuclear security in Kazakhstan. What other factors enabled such rapid progress to be made?

T. ZHANTIKIN (Kazakhstan): One factor was that many of the people in Kazakhstan who were involved in strengthening nuclear security there had had long experience of working in the nuclear energy sector. Another factor was simply that we all worked very hard.

P. SHAW (UK): I learned a great deal about emergency preparedness and response from the presentation made in Session 4 by Mr. Gabriel, of New

York City's Office of Emergency Management, and I believe that exchanges between countries of information on emergency preparedness and response would be very valuable.

W. ASHCROFT-HUTTON (UK): Such exchanges are already taking place. Today, if I had not been requested to attend this conference, I would be hosting an exchange of information on nuclear emergency preparedness and response with colleagues from the USA.

E.T. FEI (USA): The authorities in New York City, which considered themselves to be a likely terrorist target, did not wait for the federal governmental to prompt them before launching an emergency preparedness and response programme. I imagine that much the same applies to cities such as Moscow and London. Perhaps international exchanges of information would be more useful if they took place at the city level rather than the national level.

L.S.H. HOLGATE (USA): In response to what was said just now by Mr. McCann and Mr. Djaloeis, I suggest that some activities giving rise to nuclear security problems could be reduced and the development and application of nuclear energy for peaceful purposes could be promoted if certain of the world's research reactors — especially those with high enriched uranium fuel — were replaced by a smaller number of research reactors with low enriched uranium fuel located in well guarded regional centres of excellence.

J.A. BARRETT (UK): In response to Mr. McCann's query about reducing activities that have given rise to nuclear security concerns, I would recall the three principles of the International Commission on Radiological Protection (ICRP) regarding practices which involve the use of radioactive material — justification, optimization and limitation.

Such practices should be permitted only if they are justified in the light of the balance between the potential detriment due to radiation exposures and the potential socioeconomic benefits. If it is determined that a practice is justified (often a political decision), the practice should be conducted in an optimum manner and the associated risks should be kept within acceptable limits. Thanks to that approach, humankind has enjoyed huge benefits from applications of radioactive material in health care, industry and other fields.

A.T. LUKSIC (USA): I should have liked a discussion at this conference of the minimum security standards necessary to ensure that nuclear material and facilities are secure — rather than simply statements about the need to protect such material and facilities.

PANEL DISCUSSION 2

LESSONS LEARNED AND PRIORITIES

Chairperson: **A. Nilsson** (IAEA)

Members: **N. Diaz** (United States of America)
J. MacNaughton (United Kingdom)
D. Rehir (Malaysia)
R. Stratford (United States of America)

S.B. ELEGBA (Nigeria): From what has been said at this conference it is clear that ‘nuclear security’ is a very general term and that we need to make a distinction between the security of radioactive sources and the facilities where they are used (laboratories, hospitals and so on) and the security of nuclear material and nuclear fuel cycle facilities. In my view, the former is well catered for by the Code of Conduct on the Safety and Security of Radioactive Sources and the Global Threat Reduction Initiative, which offer a basis for international and regional cooperation.

As regards nuclear material and facilities used in both non-nuclear-weapon States and in nuclear weapon States, an effort should be made to work out international and regional arrangements to implement provisions of the amended Convention on the Physical Protection of Nuclear Material (CPPNM). This may, however, be more difficult than arrangements for the security of radioactive sources and the facilities housing them.

J. RAUTJÄRVI (Finland): How can we communicate in such a way that the information sharing leads to timely and effective action?

N.J. DIAZ (United States of America): The US Nuclear Regulatory Commission, which is — despite its name — essentially a radiation protection agency, is already very good at sharing information relating to radiation protection, as are, I am sure, many of the other organizations represented at this conference. When it comes to nuclear security related information, I believe that the necessary knowledge base exists and that the issue is one of communication.

In my view, the best means of communication is ‘communication protocols’ covering particular areas and targeting particular ‘communities’ — the nuclear industry, customs authorities and so on. Communication protocols should be living documents that are continuously improved as the knowledge base expands and in the light of feedback.

What sort of information should be included in information protocols? Obviously not detailed information about nuclear facilities, but I believe that they might include information about procedures and techniques of the kind included by the IAEA in safeguards reports. I believe that we should all commit ourselves to sharing nuclear security related information and endeavour not to magnify the difficulties involved in such information sharing.

E.S. LYMAN (USA): In my view, the USA could, through its many nuclear cooperation agreements with other countries, force those countries to adopt more rigorous physical protection standards, but it seems to lack the political will to do so. What is Mr. Stratford's view?

R.J.K. STRATFORD (USA): Attempts to make other countries do what the USA wants them to do have created many difficulties for me. That having been said, I would note that our nuclear cooperation agreements require recipient countries to apply physical protection standards that conform to the latest version of IAEA document INFCIRC/225.

We send expert teams to all countries where we have supplied facilities with high enriched uranium (HEU). They visit the locations where the HEU is used, in order to look at the physical protection measures in place. Sometimes the team reports that the level of security is not satisfactory, for example that there is no alarm system, that there are no armed guards, or whatever. We then request the country in question to rectify matters, and, if it does not, we repeat our request.

In the case of countries that we have not supplied with fuel, we may still have bilateral assistance agreements with them, and we may discuss how the physical protection of nuclear material may be improved. In no case, however, do we force other countries to adopt more rigorous physical protection measures.

A. NILSSON (IAEA): We also send teams to countries in order to look at the physical protection levels there, and we have found that it is not enough simply to recommend specific improvements. We organize follow-up visits in order to ensure that the recommendations are acted upon without undue delay. Upgrading is expensive, and the IAEA would welcome more financial support for the efforts in question.

P. SHAW (United Kingdom): In my view, the radiation protection community must recognize its limitations where nuclear security is concerned and not be reluctant to hire nuclear security experts. For example, the security of radioactive sources is a much wider field than the control of radioactive sources.

J.A. BARRETT (UK): I have been working with Mr. Shaw in the UK to increase the security of radioactive sources. I should like to see more done at the design stage to increase the safety and security of devices that incorporate radioactive sources. The aim should be to ensure that their safety and security is adequate, even when they are being misused.

N.P.J. McCANN (Ireland): I am concerned about the fact that Mr. Diaz has just implied that it is possible to be confident that any kind of nuclear security situation could be dealt with. In a recent report resulting from a dialogue between British Nuclear Fuels Limited and stakeholders, it was concluded that, no matter how robust one's nuclear security system is, one can never guarantee complete nuclear security. The report is available on the Environment Council's web site (www.the-environment-council.org.uk).

N.J. DIAZ (USA): In saying that the necessary knowledge base exists, I did not mean to imply that it is possible to be confident that any kind of nuclear security situation could be dealt with. My focus was on how information might be communicated.

T. TANIGUCHI (IAEA): After 11 September 2001 the US Government focused very much on the security of radioactive sources, but it is my impression that now, with the Code of Conduct on the Safety and Security of Radioactive Sources and supplementary guidance on the import and export of radioactive sources now in place, it is focusing more on the security of nuclear material and — inter alia — pressing for the CPPNM to be strengthened. Is my impression correct?

R.J.K. STRATFORD (USA): As regards the Code of Conduct, I think the exchange between Mr. Stern and Mr. Loy in Session 3 pointed to a widely held opinion that it should not be reviewed for the time being and that the present emphasis should be on ensuring that it is widely adhered to and effectively implemented.

The CPPNM has become an increasingly important item on the US agenda, with President Bush and President Putin stating that their two countries look forward to the completion of the CPPNM amendment process.

The USA is giving high priority to the physical protection of nuclear material. The US Department of Energy is spending hundreds of millions of dollars on securing nuclear material in the Russian Federation and elsewhere, and our programme for the repatriation of HEU supplied by the USA to other countries has been restarted. Also, the US Government is cooperating with the Russian Government on the implementation of a programme for the return to the Russian Federation of HEU supplied by the Soviet Union to other countries, and a team from the USA was involved in preparations for the recent transfer of HEU from the Libyan Arab Jamahiriya to the Russian Federation.

A. NILSSON (IAEA): Session 5 and the panel discussion have underlined the importance of the security of nuclear and other radioactive material, the security of the facilities where they are present and the security of transport when they are being moved from one place to another.

ROLE OF THE IAEA IN UNDERPINNING THE GLOBAL EFFORTS

(Session 6)

Chairperson

J. RONAKY
Hungary

IAEA ACTIVITIES, EXPERIENCE AND NEW INITIATIVES

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Abstract

The overall goal of the IAEA's nuclear security activities is to assist Member States, upon request, to improve their nuclear security, thereby reducing the risk of a successful act of nuclear terrorism. Its role in achieving this goal consists of the following broad areas: facilitating the development of, and adherence to, binding and non-binding international legal instruments; developing international guidelines and recommendations acceptable to the international community; providing related assessment services, training, equipment and technical advice; and providing or facilitating exchange of information, and related services. This paper describes the experience of the IAEA in implementing the Nuclear Security Plan of Activities beginning in 2002 and how that experience will be utilized in the development of a new Nuclear Security Plan for 2006–2009.

1. BACKGROUND

The IAEA's activities in nuclear security date back to the 1970s, when it began providing ad hoc training courses in physical protection. The IAEA issued Recommendations for the Physical Protection of Nuclear Material[1] in 1975, which has been revised four times since, most recently in 1999. Reports of illicit nuclear trafficking in the early 1990s led to the establishment in 1997 of the IAEA's Security of Material programme, which focused on the physical protection of nuclear material[2], combating illicit nuclear trafficking and

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[1] This publication became INFCIRC/225/Rev.4 (Corrected).

[2] Nuclear material: Plutonium, except that with isotopic concentration exceeding 80% in ^{238}Pu; ^{233}U; uranium enriched in the isotope 235 or 233; uranium containing the mixture of isotopes as occurring in nature other than in the form of ore or ore residue; or any material containing one or more of the foregoing.

security of other radioactive material. In 1999 the IAEA initiated efforts for cooperating with Member States to strengthen the international physical protection regime, which included the consideration of whether there was a need to amend the Convention on the Physical Protection of Nuclear Material (CPPNM).

After 11 September 2001 it became clear that much more needed to be done to protect both nuclear and other radioactive material from malicious acts. In response to a resolution of the General Conference[3], a report to the Board of Governors in November 2001[4] proposed enhanced activities based on an updated and comprehensive threat picture. Four principle threats were identified: (a) a nuclear explosive device that came into the hands of subnational groups; (b) the acquisition of nuclear material to build an improvised nuclear explosive device; (c) the acquisition of radioactive material to construct a radiological dispersal device (RDD); and (d) sabotage of installations, locations or transports involving such material.

2. LEGAL FRAMEWORK

The core of the international legal framework for nuclear security is the CPPNM. Other instruments which are also of great importance are the Code of Conduct on the Safety and Security of Radioactive Sources, safeguards agreements and additional protocols, and other international conventions such as the Convention on Early Notification of a Nuclear Accident and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency. Also of relevance is United Nations Security Council Resolution 1540 (2004), dealing with weapons of mass destruction (include nuclear) and non-State actors, and Resolution 1373 (2001), which calls for all States to become parties as soon as possible to the relevant international conventions and protocols relating to terrorism, of which the CPPNM is one.

The CPPNM is currently going through an amendment process that began in 1999. Once the CPPNM is ratified and enters into force, it is expected to make it legally binding for States Parties to protect nuclear material used for peaceful purposes, in domestic use, storage and transport, and to protect nuclear material and peaceful nuclear facilities against sabotage. It will also provide for expanded cooperation between and among States regarding rapid measures to locate and recover stolen or smuggled nuclear material, mitigate

[3] GC(45)/RES/14, B.

[4] GOV/2001/50.

any radiological consequences of sabotage, and prevent and combat related offences.

Adherence by Member States to the various international instruments relevant to nuclear security is of vital importance. While an increasing number of States are expected to ratify the CPPNM, once amended and in force, a significant number of States have still not adhered to the current CPPNM or other relevant international instruments. In that respect, the Secretariat has noted the lack of an adequate legal framework for implementation in some States.

3. AGENCY NUCLEAR SECURITY PLAN OF ACTIVITIES (2002–2005)

In March 2002 the IAEA Board of Governors approved a three year Nuclear Security Plan of Activities[5] and the creation of a voluntary funding mechanism, the Nuclear Security Fund (NSF), to which Member States were called upon to contribute[6]. The NSF was established to support, inter alia, the implementation of nuclear security activities to prevent, detect and respond to nuclear terrorism.

The results and outcome of these activities were: increased awareness in States of the importance of establishing an infrastructure, including regulatory systems, in support of nuclear security; improved preparedness in States to address the risk of malicious acts; increased legal commitments; more States joining the Illicit Trafficking Database; training and education activities held in all regions and reaching some 1500 participants; enhanced radiation monitoring capabilities established at borders; and more than 100 evaluation missions, including for overall assessment of needs, physical protection evaluation, vulnerability assessment and follow-up of previous activities and missions. The needs assessment and evaluation missions have indicated a significant number of improvements that are needed. As a result of the missions, the physical protection of several nuclear facilities has been improved, and complementary support has been provided through bilateral programmes. A substantial number of vulnerable, high activity radioactive

[5] Nuclear security: The prevention and detection of, and response to, theft, sabotage, unauthorized access, illegal transfer or other malicious acts involving nuclear material, other radioactive substances or their associated facilities (working definition established at the fifth meeting of AdSec, 1–5 December 2003).

[6] GOV/2002/10, Protection Against Nuclear Terrorism: Specific Proposals.

sources have been secured. Detection capacity has been improved at several border crossing points.

Implementation of the Plan of Activities has involved all departments in the Secretariat. Extensive coordination has been necessary to ensure effective, consistent and coherent programme implementation. The coordination includes three broad functions; planning, monitoring, and evaluation and reporting. An information management system, the Nuclear Security Knowledge Management System, provides the basis for monitoring implementation and for financial and narrative reporting to NSF donors on the use of their funds or contributions.

The IAEA's Technical Cooperation Programme has provided a mechanism for the delivery of some nuclear security activities in Member States. While the Plan of Activities constitutes the programmatic context for the IAEA's nuclear security activities, projects established within the Technical Cooperation Programme provide the delivery vehicle for training courses and, in some cases, technical assistance. By so doing, the infrastructure established for interaction with Member States has been integrated with the programmatic context, producing beneficial results and avoiding duplication of efforts.

It has been a giant leap from a small programme in 2002 with expenditures of about $1 million into a programme requiring about $11–12 million annually. Donations to the NSF have been received from 26 States, the European Union (EU) and the Nuclear Threat Initiative, plus in-kind contributions have been received from 17 countries. As of March 2005, the IAEA has received voluntary contributions of $35 million, not including in-kind donations. Money received in one year will be used as a target for the activities for the next year, to move from a floating target and obtain a precise measure of performance.

4. DEVELOPMENT OF A NUCLEAR SECURITY PLAN 2006–2009

At the beginning of 2006 a Nuclear Security Plan will need to be put into place for the next four years (2006–2009). It will be based largely on the experience gained from the implementation of the initial Nuclear Security Plan of Activities for 2003–2005. For ease of understanding, the new plan will consider the various activities in three overarching groupings: information analysis and coordination; prevention; and detection and response.

For information analysis and coordination activities, the IAEA will collect information and analyses to determine trends and priorities. One substantial activity in this area will be the continued operation of the Illicit Trafficking Database, which assembles information provided by Member

States into a database that helps show global trends in illicit trafficking. This activity area also covers the assessment and analysis of the nuclear security practices of Member States, with a view towards aggregating this information and analysis into tailored integrated nuclear security support plans (INSSPs). In addition to using this information and analysis to improve its own services, the IAEA will provide this information to Member States to assist in their prioritization and threat analysis. All information collected by the IAEA must be kept confidential.

The IAEA recognizes that coordination with Member States is also of paramount importance; the IAEA's interaction with Member States is the bedrock of its nuclear security activities. With this in mind, the IAEA will continue its activities with bilateral programmes in such partnerships as the Tripartite Initiative with the Russian Federation and United States of America and the EU Joint Action framework. The IAEA will also develop partnerships with international organizations that share responsibilities in the field of nuclear security, again with a view towards the efficient use of resources. Such partnerships already exist with various United Nations agencies; more will be initiated.

Prevention has in the long term a more effective contribution: a first line of defence building on physical protection, accountability and sustainability. Adequate security arrangements, including physical protection of nuclear and other radioactive material in use, storage and transport, and associated facilities, is an essential element in the first line of defence against possible terrorist or criminal acts. To foster adherence to and full implementation of an amended CPPNM will be a major challenge for the new plan and the international community to raise the overall level of nuclear security.

Physical protection of nuclear and other radioactive material and associated facilities will be a key part of the new plan. A comprehensive set of recommendations and guidelines for the physical protection of nuclear material will be required for effective implementation of an amended CPPNM once it is ratified and has entered into force. Likewise, a set of recommendations and guidelines for the security of other radioactive material is required for the implementation of the Code of Conduct.

The IAEA will continue to maintain and enhance its physical protection training programme in order to promote physical protection concepts and principles and assist Member States, upon request, in meeting their obligations and political commitments related to the relevant international instruments.

There is a need to identify vulnerable targets for malicious acts and measures that would alleviate or reduce their risk. The physical protection of such targets must be addressed through the principle of defence in depth: the layers of protection afforded to installations by physical barriers, a combination of engineering measures, and safety, technological and administrative measures.

Implementation of recommendations for technical improvements of physical protection in States identified through the IAEA's nuclear security services will be considered in coordination with State and bilateral support programmes as part of a fundamental commitment to preventing theft and other malicious acts involving nuclear and other radioactive material.

Accounting for and control of nuclear material is key for safeguards purposes and for security. A State system of accounting for and control of nuclear material (SSAC) is a requirement for all States with comprehensive safeguards agreements, recognizing the need for both accountancy at facilities and locations outside facilities and for interaction between the State and the IAEA for verification purposes. General Conference resolutions[7] have noted the "central contribution of Agency safeguards agreements and additional protocols and also of SSACs, to preventing illicit trafficking and to deterring and detecting diversion of nuclear material", thereby recognizing the usefulness of SSACs for safeguards and security.

A fundamental principle of physical protection is that "all organizations involved with implementing physical protection should give due priority to the nuclear security culture; to its further development and maintenance necessary to ensure its effective implementation in the entire organization."[8] The IAEA will continue to play a vital role in developing this concept on the basis of a common understanding of a healthy nuclear security culture. In addition, the sustainability of security systems — a concept that is closely linked to nuclear security culture — needs to be better addressed in an international environment, and steps to maintain and improve nuclear security measures at a higher level should be considered.

In a comprehensive system, if there is theft, sabotage or a threat there has to be a second line of defence: this is detection and response. Detection is primarily thought of as border detection of smuggling and illicit trafficking in nuclear and other radioactive material. In each State various organizations share the responsibility for detecting radioactive material at borders and other locations that could be used in malicious acts. Staff in these organizations, who may not have a scientific education, need to be well trained in understanding the threat, in using radiation detection instruments and in handling and

[7] For example GC(48)/RES/11.

[8] GOV/2001/41, Nuclear Verification and Security of Material: Physical Protection Objectives and Fundamental Principles, 2001, and also contained in the amendment to the CPPNM.

securing such material. Continued efforts are required to improve and expand access to technology and user friendly instruments for detection and identification, to assist in assessing existing detection systems and techniques, and to provide/obtain support for improving them.

With regard to response, it is worth while to note that in addition to radiological emergency response systems, the plan also has to incorporate responses to situations that have not yet resulted in a radiological release — for example, a threat of sabotage at a nuclear facility or the confiscation of radioactive material by law enforcement authorities.

It is expected that the provisions of amendments to the CPPNM, when in force, will generate additional obligations for States to respond to seizures of nuclear and other radioactive material. A wide range of measures is needed for preparedness and response to illegal and malicious acts involving nuclear and other radioactive material. These measures must involve all national and international authorities and organizations with related responsibilities and must be fully coordinated with radiological emergency response measures. Guidance on preparedness for and response to such acts — and also to acts of attempted sabotage or theft at facilities — and additional training and support material must be developed and made acceptable to States.

The potential for an RDD is relevant for all States, and requires some basic preparedness. While nuclear emergency preparedness is, in States with nuclear facilities, centred on these facilities, the preparedness to deal with the RDD threat has no geographical limitation. Response to such acts requires a wide range of actions, involving law enforcement organizations, civil authorities and radiological emergency response authorities. It will also involve activities related to public education. In this respect, radiological emergency preparedness is similar for radiological emergencies involving RDDs, orphan sources or transport events.

5. MODALITIES OF IMPLEMENTATION OF THE NEW PLAN

The IAEA's new Nuclear Security Plan will rely on familiar modalities for programme implementation, as in previous years.

Nuclear security guidance: A comprehensive set of guidance documents, published in the Nuclear Security Series, will provide benchmarks for States and for the IAEA's activities. The guidance documents will be linked to the implementation of obligations contained in international legal instruments. The process of developing, reviewing and publishing the Nuclear Security Series will ensure high quality documents, in part through a thorough and extensive review by Member States prior to publication. The process will also take into account information security and confidentiality issues and recognize that nuclear security is intricately linked with national security concerns.

Application of nuclear security guidance: Technical advice and assistance for the implementation of improved and strengthened national nuclear security systems will be necessary. Where urgent needs are identified, they must be addressed quickly. The IAEA will coordinate services with bilateral and multilateral programmes through which assistance can rapidly be mobilized at the request of States to strengthen their national security systems.

Nuclear security services: For evaluation of existing nuclear security systems, the IAEA will continue to offer nuclear security services, but in a more flexible manner. A modular International Nuclear Security Service, built on existing missions, will help States, on request, to identify their nuclear security needs. 'Modular' implies that missions will be tailored to the needs of States and that a flexible approach may be applied. Synergies between missions performed for safety, security and safeguards will be taken into account wherever possible. Recommendations for improvements will be included in INSSPs to build a long term work plan tailored to individual Member States in coordination with bilateral and other concerned parties.

Human resource development: A comprehensive training programme targeted towards the full range of national functional responsibilities will be implemented at the national, regional and international levels. Training and education were essential to the IAEA's approach to enhancing physical protection systems in States. Courses, workshops and seminars performed on six continents raised awareness and hands-on knowledge of subjects including the physical protection of research facilities, the practical operation of physical protection systems, engineering safety aspects of physical protection and managing situations involving malevolent acts. The IAEA's training and education activities will increasingly build on 'off the shelf' modules that can be offered periodically and will emphasize the principle of 'train the trainers'. Training centres designed to build capacity and establish sustainable resources at the national and regional levels will be established.

Research and development: Programme approaches, guidance and instrumentation depend on up to date development efforts. Coordinated research projects (CRPs) will be used as a vehicle for research and development. Through these CRPs, research contracts will be awarded to national laboratories for particular related tasks and the project results will be made available to Member States.

Evaluation services. Rather than offering discrete types of missions (International Physical Protection Advisory Service, International Nuclear Security Advisory Service, Radiation Safety and Security of Radioactive Sources Infrastructure Appraisal, Emergency Preparedness Review), the

IAEA will develop a comprehensive nuclear security advisory service through which Member States can easily assemble their own evaluation package.

6. OTHER FEATURES OF THE NEW NUCLEAR SECURITY PLAN

The IAEA's newly established Incident and Emergency Centre (IEC) will provide an open door for Member States to obtain support in dealing with security incidents (e.g. seizures at borders, thefts and attempts of or actual sabotage). The IEC will be an important vehicle for enhancing the IAEA's ability to provide relevant assistance. Security competencies will be utilized in developing IEC procedures. In addition, experts will be provided to assist States, on request, in the development of national procedures to coordinate and carry out response to security incidents involving nuclear or other radioactive material. The importance of continually reviewing existing procedures and conducting periodic exercises will be emphasized.

It has become clear that large public gatherings/events are major targets for terrorist acts. Additional nuclear security measures are required at such events. The success of the comprehensive and multidimensional programme to prevent nuclear terrorism at the 2004 Summer Olympic Games in Greece has led to the conclusion that such preparedness and arrangements are relevant also for other large public events. The development and publication of guidance to advise and support States in nuclear security when hosting large public events is a new and important initiative of the IAEA.

Effective implementation of nuclear security activities depends on sustainable partnerships at the regional and international levels and also within States. This necessitates effective coordination mechanisms to communicate with those involved in nuclear security. The IAEA, recognizing the importance of avoiding duplication and of gaining more support from the donor community, will increase information exchange and communication of priorities, activities and programme management objectives with all interested parties for all activities. While there are regional partnerships and cooperation centres established in several parts of the world, there are regions in which we are still looking for suitable partners for cooperation.

The IAEA is moving from its initial efforts of implementation through an ad hoc approach to a more systematic approach. After three years of implementation, it is time to recognize that nuclear security will remain a core programme for a long time.

7. CONCLUSION

The IAEA must continue and accelerate its efforts to assist States in combating threats involving nuclear and other radioactive material. There are a number of challenges in front of the IAEA and its Member States: sustainability and nuclear security culture are vital concepts that must be enhanced; development of a systematic approach to implementation rather than ad hoc activities; ensuring and continuing funding for both IAEA activities and those in Member States. Experience has shown that enhanced coordination and cooperation is vital to complement ad hoc arrangements. INSSPs will play a larger role in establishing regional activities to focus, promote and streamline global nuclear security activities. Information exchange will provide the basis for working together with international organizations. Above all, these activities and initiatives must continue to maintain confidentiality of the information acquired, otherwise this effort will not be able to proceed in a manner that will gain the needed and widespread confidence of Member States and international organizations.

FUTURE GOALS AND CHALLENGES OF THE IAEA NUCLEAR SECURITY PROGRAMME

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1. INTRODUCTION

It would be difficult to overstate the urgency of intensifying our collective efforts to secure nuclear material worldwide. The graphic images of 11 September 2001 make abundantly clear the willingness of terrorists to inflict unthinkable destruction and pain. Imagine what the consequences would be if terrorists were to acquire and use dangerous nuclear material to attack any one of us. The quality and scope of nuclear material security must be enhanced if we are to prevent nuclear terrorism. It must be a high priority for all of us.

It was this awareness that prompted initiation of the IAEA's nuclear security programme, the subject of my remarks. Immediately after the tragedy of 11 September 2001, several IAEA Member States approached the Director General about the need to strengthen the IAEA's ability to assist Member States in protecting their nuclear and radioactive material against the emerging threat of terrorism. The IAEA responded with alacrity. At the March 2002 IAEA Board of Governors meeting, the Secretariat presented its comprehensive, cross-cutting Nuclear Security Action Plan. The plan has, since then, served as the foundation for the implementation of all IAEA nuclear security activities.

To facilitate implementation of the plan, organizational changes were needed. In 2002 the Office of Physical Protection and Material Security was removed from the Department of Safeguards, renamed the Office of Nuclear Security, and relocated to the newly created Department of Nuclear Safety and Security. When this reorganization began, the Office of Physical Protection and Material Security had fewer than ten staff members. Currently, the Office of Nuclear Security has quadrupled to more than 40 staff members engaged in full time or part time capacities.

Since its inception in 2002, the IAEA's nuclear security programme has provided direct assistance to over 75 countries, in the form of assessment missions, training courses or support for development of national guidelines and regulations. Several non-Member States have also used IAEA standards or guidelines when creating their own security regulations and practices. Much has been accomplished in a short period of time, and we appreciate the efforts that have been taken, but there is much more to be done.

While physical protection of nuclear material and facilities and control of radioactive sources have been an integral part of the IAEA's mission for many years, they have become an indispensable part of IAEA programme objectives since 11 September 2001. In response to increased concerns expressed by Member States, the IAEA's nuclear security programme was accelerated and expanded in March 2002 to embrace a broader coverage of malicious acts such as the use of radioactive material by terrorists. Initially the programme was given a three year life span. We are at the end of that period, and the need to continue the programme is well established. It is now appropriate to examine how the programme can be improved to best serve the needs of Member States and to help ensure that weak links in the security chain are found and addressed without disrupting peaceful nuclear applications.

2. CHALLENGES

We believe that in the three short years of its existence, the programme has matured to a point where it is capable of supporting a broad range of basic services to Member States. This has been amply demonstrated, and we should be pleased but not content. Working with other parts of the IAEA, the Office of Nuclear Security deploys assessment teams upon request, identifies subjects most in need of international guidelines or standards, helps to draft them accordingly and provides a wide variety of training courses to Member States. The IAEA has also successfully assisted Member States in obtaining much needed detection and other equipment for use in monitoring national borders. Most of the work undertaken in the past three years has been in response to requests for assistance from Member States.

Now it is time to look forward. We believe the most immediate and important challenge facing the nuclear security programme is to identify and clearly prioritize its goals and activities to address continuing global nuclear security concerns, and to complement other activities of the IAEA. What direction will the programme take in the next three to five years, given the expectation that the Convention on the Physical Protection of Nuclear Material (CPPNM) will be amended this summer, with new obligations to protect nuclear material? What will be the programme's major achievements, and how will they be accomplished? How will its activities be coordinated and aligned with other multilateral and bilateral efforts to maximize effectiveness?

If a Member State avails itself of all of the assistance available to it, will that assistance be internally consistent and coherent, and will it result in a strengthened capability to secure nuclear and radiological facilities from malicous use or attack?

In order to define programme priorities, those involved with the future direction of the nuclear security programme must be clear about the fundamental purpose of this programme. Is it intended simply to respond to requests for assistance from Member States, or should it also be charged with identifying those situations where the likelihood of nuclear terrorism is greatest? If the IAEA pursues the latter, it will need both more analytic capability and closer collaboration with Member States. The scope of the programme will have to be recalibrated to take into account the substantial efforts occurring outside the ambit of the IAEA. It should be asked whether the limited resources of the nuclear security programme are best allocated to assisting the maximum number of States or whether its resources should focus more narrowly on cases of particular concern.

The United States of America believes the correct answer is a mix of the two. The IAEA should continue to respond to requests for nuclear security assistance from Member States. At the same time, the IAEA should begin to assess where its limited resources can best be allotted to reduce the risk that nuclear or high risk radioactive material could be acquired by terrorists. That core effort should include development of a coherent programme of assistance to Member States in implementing their obligations under an amended CPPNM and the Code of Conduct on the Safety and Security of Radioactive Sources.

As the nuclear security programme moves ahead, both donor and recipient States must be satisfied with the programme's work. States that contribute to the Nuclear Security Fund (NSF) and those that receive NSF assistance will have different perceptions of what constitutes a successful IAEA nuclear security programme. These competing views can be constructive, but we believe that harmonizing them is central to the long term success of the programme. My government would like to see the IAEA take on a more formal role in facilitating coordination between donor and recipient States. The IAEA played such a role in assisting States in establishing State systems of accountancy and control (SSAC) of nuclear material; a similar approach would be useful in helping Member States combat the threat of nuclear terrorism.

Funding for the nuclear security programme is vital, but at present Member States have no formal obligation to contribute to the NSF. Without predictable and reliable funding, programme managers cannot effectively plan long term activities. Equally important, they are hampered in their ability to recruit and retain experienced staff. Since most NSF contributions are earmarked by donor States to specific geographical areas or activities, the ability to direct resources to real programme needs is further limited. As any manager can appreciate, these conditions can seriously restrict rational planning. We urge all Member States to continue — and increase if possible — their financial, technical and in-kind support to the nuclear security programme, and to do so under flexible terms.

Another programme challenge is to better coordinate the nuclear security programme with bilateral programmes of NSF donor States. Duplications and redundancies should be avoided wherever possible. NSF donors, including the USA, spend millions of dollars a year working with other nations to secure nuclear and radioactive material around the world. The IAEA is a relatively new player in this arena, and it is in everyone's interest to ensure that the work of the nuclear security programme is coordinated with the major donor States. This may not be easy, but it is absolutely essential in order to achieve the most efficient and maximum use of limited resources.

Long term solutions for sustainability of nuclear security programmes must be developed to ensure that the requisite operational and regulatory infrastructure is in place. Recipient States should be able to accept and utilize equipment, provide maintenance, manage upgrades, provide for training and prosecute violators with success. Meeting these programme challenges will help create an enduring nuclear security culture.

Finally, there is a key bureaucratic challenge — there always seem to be bureaucratic challenges. The nuclear security programme needs to be more clearly defined and effectively coordinated within the Department of Nuclear Safety and Security. The IAEA has struggled to coordinate safety and security in the most effective way since the Office of Nuclear Security was created. We encourage the IAEA to accelerate these efforts and remove redundancies in Member State assistance programmes and ensure that the guidance provided to Member States is clear and practicable. We urge IAEA senior management to become more involved in the process of ensuring that the Office of Nuclear Security finds its proper role within the Secretariat. This, we believe, is necessary for effective coordination with other parts of the IAEA on nuclear related matters. The fight against nuclear terrorism will progress if there is common purpose within the IAEA and in its relations with Member States.

3. PROPOSALS

I have just sketched some major programme challenges facing the nuclear security programme. Let me suggest, in general terms, some ways that might help address these challenges in the months and years ahead. To identify and prioritize future activities, IAEA staff and Member States need an annual roadmap to direct where the programme should go and how to get it there. Periodic reviews of this roadmap, once developed, would reveal those activities that are in high demand and those that are not. This could illuminate those IAEA programme capabilities not being employed by Member States and provide valuable insight into ways the nuclear security programme could improve its outreach. The creation last year of international nuclear security support plans is a useful first step. These plans include a schedule of future security work between the IAEA and Member States once IAEA assessment missions are completed. The USA believes that the use of these support plans can help clarify nuclear security priorities. Used appropriately, and with the incorporation of security findings from all IAEA missions, they can be an excellent tool for tailoring the programme to the immediate needs of recipient States. Implementation of effective planning tools such as these should be a major nuclear security programme goal.

Different Member States have different requirements in preventing the misuse of nuclear and radioactive material. Even those States that do not possess such material must be vigilant in preventing illicit transit through their territory or disallow nuclear and radioactive material to be transported illegally within their boundaries. We strongly encourage the IAEA to intensify work with Member States that face a high risk of malicious acts. Since the malicious use of these materials poses a grave concern to all nations, the IAEA and Member States have an obligation to do everything possible to minimize the risk of dangerous material falling into terrorist hands. Global security is only as strong as its weakest link. Active engagement in higher risk countries is a sensible and achievable nuclear security programme goal. Active engagement will be especially important to assist Member States to carry out their obligations under an amended CPPNM and Code of Conduct.

To improve coordination, the IAEA should seek to establish clear lines of communication between the Office of Nuclear Security, other parts of the IAEA and relevant partners. This coordination could be defined during the development of integrated nuclear security support plans. Such communication would enhance prospects for the best possible results in terms of security improvements, technical guidelines and efficient use of limited resources.

If the IAEA is to implement these and other proposals, it will need to expand and carefully structure its security staff. Consideration should be given to a more formalized staff structure that allows programme leaders to delegate increased responsibility to their staff and free senior managers to focus on planning and prioritization. It would be helpful to have a clearer delineation of responsibilities within the Secretariat to promote better understanding of how the programme works and who in the Secretariat is responsible for this work. This should include a more complete definition of the role of the Technical Cooperation Department in the provision of nuclear security assistance.

Another proposal is to maintain a regular dialogue with donor and recipient States to monitor the effectiveness of the nuclear security programme. At present, nuclear security items appear on Board of Governors' agendas, and donor meetings are held. Neither is a completely appropriate forum for the IAEA and Member States to communicate their detailed programme concerns and priorities to each other. A regularized, open communication channel between the IAEA and Member States could be established, whether through formal meetings or informal consultations. This would provide continued assurance that the programme is evolving commensurate with Member State needs.

Finally, we would like to suggest that Member States assist the nuclear security programme by normalizing their NSF funding. There is an ongoing debate about whether the IAEA's nuclear security activities should be funded through the regular budget or via continued voluntary contributions. The Secretariat can provide evidence of the concrete results of its work to help shape this decision. It can, for example, respond to Member State priorities, maintain regular communication with national authorities, exhibit positive results and deliver them in the most efficient way possible. This, hopefully, will encourage continued financial support to the NSF.

4. CONCLUSION

The Secretariat will soon ask IAEA Member States to approve an updated version of the Nuclear Security Action Plan. A majority of Member States agree that the need for the nuclear security programme is real and should continue into the foreseeable future. We share that view. How the programme adjusts to the challenges of expansion is its next big test. I hope the suggestions I have outlined today will be helpful to the IAEA as it approaches this task. Since the stakes are so high for all of us, it should be our collective responsibility to ensure the continued success of this unique international security initiative.

THE IAEA AS A PARTNER IN NUCLEAR SECURITY INITIATIVES

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Abstract

Over the past five decades India has developed a comprehensive capability covering the entire nuclear fuel cycle. In the field of products and services related to radiation technology, India has built up a strong infrastructure, developed expertise and produced a variety of radioisotopes for the benefit of society. As an important element of nuclear security, the Indian Government exercises strict control over all activities related to atomic energy and has well established legislative, regulatory and export controls, a State system of control and accounting and integrated physical protection systems. India's partnership with the IAEA dates back to the IAEA's inception and includes a nuclear safety and security programme. A roadmap for a continued partnership with the IAEA's nuclear safety and security programme, with India playing the role of regional resource centre and training hub in the region, is suggested.

1. OVERVIEW OF INDIA'S ATOMIC ENERGY PROGRAMME

The Department of Atomic Energy (DAE) in India was set up with the mandate to harness nuclear energy for the generation of electricity, to develop radiation technologies and advanced technologies for varied applications for the benefit of society and to promote research and development in the country [1]. Based on the availability of limited uranium resources and vast thorium resources (32% of the world's deposits), a three stage nuclear power programme was adopted by the DAE. The first stage of the programme comprises setting up pressurized heavy water reactors (PHWRs) and associated fuel cycle facilities, the second stage envisages the development of fast breeder reactors using uranium and plutonium obtained from the depleted uranium fuel of the first stage and the third stage aims at the development of reactors based on ^{233}U fuel obtained from irradiated thorium.

The first stage of the nuclear power programme is already at the commercial stage. The second stage began with the setting up of a 500 MW(e) prototype fast breeder reactor. In the field of thorium utilization, the Kamini reactor at Kalpakkam, which uses ^{233}U fuel produced from irradiated thorium, has been operating since 1995. To expedite the transition to thorium based systems, an advanced heavy water reactor is being developed. For further utilization of thorium, a roadmap has been prepared to develop accelerator driven subcritical systems.

The DAE has formulated a programme that envisages setting up a 20 000 MW(e) installed nuclear power capacity by 2020. A recent study carried out by the DAE examined all available energy resources in the country and concluded that in 2052 the contribution of nuclear power would be about one quarter [2]. The DAE has a well established indigenous capability over the entire nuclear fuel cycle.

Over the years the DAE has built up a strong infrastructure and developed expertise and gained a wide range of experience in the field of products and services related to radiation technology. A variety of radioisotopes are produced for use in medicine, industry, agriculture and research. Radioisotope products are supplied to institutions in India and abroad.

2. LEGISLATIVE AND REGULATORY FRAMEWORK

As an important element of nuclear security, the Indian Government exercises strict control over all activities related to atomic energy and has a well established legislative and regulatory framework. The first Atomic Energy Act in India was promulgated in April 1948, soon after independence, vesting the Indian Government with exclusive authority and strict control over all activities relating to the development of atomic energy in the country. Subsequently, a more comprehensive act was enacted in 1962 (known as the Atomic Energy Act 1962) by repealing the Atomic Energy Act of 1948. The Atomic Energy Act prohibits the acquisition, production, possession, use, transfer, transport, export, import or disposal of any nuclear or radioactive material without a licence. Thus the act provides the basic legal framework for both nuclear and radiological safety. Several rules have been framed under this act for regulating the various activities related to atomic energy. These rules and the various notifications issued thereunder provide the necessary regulatory infrastructure for implementation of an effective regulatory programme over the activities of the entire nuclear fuel cycle and in the application of radioactive material in industry, medicine, agriculture, hydrology, research and development, and education, thus covering the life cycle of radioactive sources right from the cradle to the grave.

The statutory responsibility for exercising regulatory control of all atomic energy related activities in the country is vested with the Atomic Energy Regulatory Board (AERB). The AERB lays down safety standards, safety codes and safety guides and frames the relevant rules and regulations.

India has a well established export control system, which is based on several different legislations, including the Atomic Energy Act 1962, Foreign Trade (Development and Regulation) Act 1992 and the Customs Act 1962. In regard to the export of nuclear and nuclear related items, it is the Atomic Energy Act and the rules framed under this act that provide the necessary framework, and the DAE, a nodal department of the Government of India, deals with all nuclear related matters.

3. MATERIAL PROTECTION, CONTROL AND ACCOUNTANCY

Comprehensive and detailed procedures are in place for the physical protection, control and accounting of nuclear material to prevent any unlawful access or unlawful leakage. The Nuclear Material Accounting Cell of the DAE is responsible for the State system of accounting and control (SSAC) of nuclear material. Periodic inspection and audit of different installations is routinely carried out in order to ensure the maintenance of accurate records of nuclear material in production, use, storage or transport.

The physical protection of nuclear material and installations against malicious acts of sabotage and theft is of great national and international concern, and due emphasis has been given to this area from the early phase of the atomic energy programme in India. Several mechanisms and measures have been instituted towards meeting the goal of a strong physical protection regime for all nuclear related activities.

India has adopted a multilayered physical protection scheme following the defence in depth philosophy. This defence in depth philosophy applies not only to the design of the physical protection system but also to the administrative and operational measures applied for all types of nuclear activities. India has established an integrated system of physical protection for nuclear and other radioactive material and facilities over the entire life cycle of use, storage and transport against sabotage, theft and other malicious acts. This multilayered system of physical protection has evolved greatly over the years. Indian physical protection systems are designed to address the facility specific design basis threat (DBT), deduced from the national DBT.

Engineered systems, viz. instrumented systems for detection, delay, access control and surveillance, play a very important role in the successful implementation of a physical protection system (PPS). Over the years, many systems and sensors have been deployed in various nuclear activity areas commensurate with the required security level. In addition to instrumented PPSs, additional administrative and operational measures have been introduced to strengthen PPSs. These are supported by a well equipped and trained response force. A well defined contingency plan also exists to address emergency situations such as radiological sabotage, theft of nuclear material, intrusion into a facility or an accident.

4. PARTNERSHIP WITH THE IAEA

The IAEA is the unique multidisciplinary organization with the mandate to accelerate and expand the peaceful uses of atomic energy and in the process ensure that these uses are safe and secure. We appreciate the IAEA's Global Nuclear Security Initiative, which collaborates and coordinates with Member States and regional and international organizations. India's partnership with the IAEA dates back to its inception and has been fruitful. India is fully committed to all international efforts against terrorism, including nuclear and radiological terrorism. India has been actively supporting the IAEA's programmes, including those related to nuclear safety and security, and has contributed to the IAEA's efforts in drawing up the Nuclear Security Action Plan. Indian experts are on various committees, including the Nuclear Safety Standards Committee, Radiation Safety Standards Committee, Waste Safety Standards Committee, Transport Safety Standards Committee, Commission on Safety Standards, International Safety Advisory Group and Advisory Group on Nuclear Security.

India is party to the Convention on the Physical Protection of Nuclear Material (CPPNM). Our experts have taken an active part in the group of legal and technical experts to prepare a draft amendment to the CPPNM. We are continuing to work towards arriving at a consensus on this issue during the forthcoming diplomatic conference. India was one of the cosponsors of the resolution on the Code of Conduct on the Safety and Security of Radioactive Sources at the IAEA General Conference. We have written to the Director General of the IAEA stating that we fully support and endorse the IAEA's efforts to enhance the safety and security of radioactive sources. Our experts have participated in the work on the document outlining guidelines for the export and import of radioactive sources to supplement the relevant provisions of the revised Code of Conduct on the Safety and Security of Radioactive Sources.

As a part of the IAEA Code of Conduct on the Safety and Security of Radioactive Sources, we conducted a regional workshop on development of national strategies for improving control over radiation sources including orphan sources in April 2004. We conducted a regional workshop on regulatory authority information systems (RAISs), which can be used for creating and maintaining a national registry of radiation sources. The workshop was very interactive, and each participating country realized the importance of a database inventory system for ensuring the safety and security of radioactive sources. The workshop received an overwhelming response from 29 foreign participants from South Asia–Pacific countries. It was realized that many more programmes of such types are required to harmonize database systems internationally. India has made a substantial contribution to the development of an RAIS system and is working closely with the IAEA for further improvements in the system.

Two regional training courses on nuclear security have been organized in India, one in May 2003 and the other in October 2004. In the first course seven faculties out of 13 were drawn from abroad, while in the second course most of the faculties (10 out of 14) were from India. The focus of the first course was the security of nuclear installations, with special emphasis on the security and control of radioactive sources. Security culture was dealt with for the first time in such a course. The second course was primarily on the physical protection of nuclear installations and material. In both the training courses, besides lectures and workgroup exercise sessions, a field trip to a nuclear power station demonstrating an actual physical protection system was arranged for the benefit of the participants. The participants of both the courses have provided very positive feedback on different aspects of the courses.

India participated in the IAEA's search exercise in Georgia to locate highly active ^{90}Sr sources and other orphan sources. India offered both state of the art instruments and expert human resources. An aerial gamma spectrometry system (AGSS) developed indigenously and ten survey meters were sent to Georgia. An AGSS fitted with a global positioning system was mounted in a vehicle, and several hundred kilometres of Georgian countryside was scanned. Training was also imparted in the operation of AGSSs. The equipment proved useful and effective in the difficult conditions that prevailed in the country. Apart from the technical support, as a responsible designate member of the Board of Governors of the IAEA we have always supported the IAEA's activities in the vital area of nuclear safety and security.

5. ROADMAP FOR THE FUTURE

Based on five decades of hands-on experience in nuclear safety and security and in conducting various IAEA regional training courses and with a well established information technology background and expertise in the fields of knowledge management, India can play the role of regional resource centre and training hub in the region. Last month a joint delegation of representatives from the US Department of Energy and the IAEA visited India for the first India–USA–IAEA trilateral meeting on the Regional Radiological Security Partnership (RRSP) programme. The US and IAEA representatives welcomed India's participation in the RRSP programme as a regional partner and discussions were held to work out the modalities of this cooperation. The three sides acknowledged their shared objective of enhancing globally the security of dangerous radioactive sources. The US and IAEA delegates expressed appreciation for India's offer of providing infrastructure and expertise on a regular basis by conducting an international training course in India under the aegis of the IAEA on issues related to the security of radioactive sources and material and for locating orphan radioactive sources in countries that are unable to effectively deal with them and that seek assistance from the IAEA. We would like to realize the objective of the RRSP programme with the IAEA.

As a partner with the IAEA we are willing to hold the hands of Member States in the region by way of setting up regulatory infrastructure, ensuring adherence to the Basis Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources, implementing the Code of Conduct on the Safety and Security of Radioactive Sources and conducting training programmes and setting up infrastructure for emergency preparedness. India can provide various instruments for detection and control of, and search for, radioactive material, radiation monitoring and special nuclear material monitoring, and integrated systems for physical protection. India can also participate in the development of methodology, codes, standards and guides for nuclear security applications.

6. CONCLUSION

The global direction for the future must be a continuous improvement towards excellence in nuclear security, all along realizing that it is a journey and not a destination. In promoting international cooperation and partnership in the area of nuclear security, it has to be recognized that security and security technologies cannot be divorced from each other. Technology is the key to the development of a practical, cost effective and sustainable framework for protection against terrorism in general and nuclear terrorism in particular. I would like to conclude by reiterating that it should be our endeavour under the aegis of the IAEA, the unique multidisciplinary organization in the United Nations system, to promote the development of technologies with inherent security features for the protection of nuclear and other radioactive material, during its use, storage and transport, and facilities against theft, sabotage and malicious acts. The availability of such technologies should be ensured without any discrimination for commercial deployment globally so that the world can continue to benefit from the ever increasing peaceful applications of atomic energy for the health and prosperity of humanity. Let us remind ourselves that 'security anywhere is security everywhere'.

ACKNOWLEDGEMENTS

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DISCUSSION

R.F. CAMERON (Australia): Clearly, a lot of good work has been done in the nuclear security area, but I believe that there is a need for a more systematic approach. In developing such an approach, one could perhaps draw on experience gained during implementation of the IAEA's Model Projects for Upgrading Radiation Protection Infrastructure, with their milestones. In the nuclear security area, one could have milestones like 'completion of a national threat assessment', 'establishment of border controls' and 'establishment of emergency response arrangements' as part of a checklist, backed by a series of documents with guidance on how countries might attain those milestones.

A. NILSSON (IAEA): I agree with Mr. Cameron. A few years ago we hoped that nuclear security would be a matter of ad hoc quick fixes, but we have since come to realize that a long term, systematic approach is necessary. We shall draw on experience gained during implementation of the model projects, but we are very conscious of the fact that, whereas nuclear security is a young discipline, radiation protection is an old one and most of its many practitioners have it 'in their bones'. However, we hope to reach that stage in the nuclear security area in due course, overcoming whatever obstacles are encountered on the way.

A.J. AL KHATIBEH (Qatar): Could Ms. Nilsson explain the relationship between the Office of Nuclear Security and the Department of Nuclear Safety and Security?

A. NILSSON (IAEA): The Department of Nuclear Safety and Security, headed by Deputy Director General Taniguchi, consists of the Division of Nuclear Installation Safety, the Division of Radiation, Transport and Waste Safety and the Office of Nuclear Security. These three organizational entities are continuously consulting with each other for the purpose of coordinating their activities, as far as possible.

S.D. SAGAN (United States of America): The IAEA recommends that every country carry out a threat assessment, and provides a recommended assessment methodology, but it does not stipulate a minimum threat that should be taken into account. A country could therefore conclude that in its case there was no threat warranting, say, the arming of the guards at various facilities. Should the IAEA not stipulate a threat which countries ought to take into account as a minimum when applying the recommended threat assessment methodology?

A. NILSSON (IAEA): Stipulating a minimum threat sounds rather like setting a standard, and in the nuclear security area the IAEA is not going to set standards. The IAEA document INFCIRC/225/Rev.4 (Corrected) outlines the functional aspects of national physical protection systems. Countries on a voluntary basis implement such systems, and the manner in which they are implemented may differ substantially from one country to another. In the IAEA's view, voluntary implementation makes for greater effectiveness in the nuclear security area. It enables more account to be taken of cultural differences between countries — cultural differences as regards, for example, the question whether or not guards at nuclear facilities should be armed. If the cultural climate in a country precludes the arming of such guards, an alternative must be found. There are possible alternatives.

S.D. SAGAN (USA): I should like to ask Mr. Raghuraman whether the threat assessments performed in India take the insider threat into account.

K. RAGHURAMAN (India): The design basis threats for our various nuclear facilities take account of local conditions, which can vary substantially from region to region for such a large a country. As regards the insider threat during nuclear facility operations, we take measures such as monitoring of workforce behaviour with the help of social workers, who focus on things such as family problems. However, we are aware that we must not be complacent, which is why we believe that we should be constantly asking ourselves 'what's new?'.

M. BAHRAN (Yemen): Regarding Mr. Cameron's reference to the IAEA's Model Projects for Upgrading Radiation Protection Infrastructure, I would mention that Yemen has benefited greatly from one of the model projects. In my view, the model project approach should be adopted in the nuclear security area.

P.A. COMELLA (USA): In my view, what could be achieved in the nuclear security area through adoption of a model project approach could be achieved through dynamic implementation — with regular updating — of the integrated nuclear security support plans which have been generated by the IAEA for a number of Member States.

K. OZAKI (Japan): In my view, it is important that the IAEA cooperate closely with international law enforcement organizations like ICPO-Interpol and Europol. Could Ms. Nilsson tell us something about the IAEA's relationship with such organizations?

A. NILSSON (IAEA): An important aspect of that relationship is the exchange of confidential information. It is necessary to agree on what kinds of information may be exchanged and on the circumstances under which information exchange may take place. We are well on the way to concluding a memorandum of understanding with ICPO-Interpol on these issues. Much of the confidential information in question is provided by IAEA Member States, and they must remain confident that the information provided by them is being handled in an appropriate manner.

D.M. LOWRY (United Kingdom): Earlier this week, the UK Government announced that it was going to contribute an additional £350 000 to the IAEA Nuclear Security Fund. On the same day our Chancellor of the Exchequer announced that an additional £400 million was going to be allocated to supporting the British troops in Iraq. I find the UK Government's priorities very odd.

N.Q. MOTE (USA): Have any estimates been made of the long term costs of security programmes in the nuclear industry and in medicine and other fields where radioactive material is used? It is important not to mandate security related activities without ensuring that the necessary financial resources are going to be available.

A.K. SEMMEL (USA): I agree with you, but I do not know whether there are any systematic efforts under way to make such estimates.

A. NILSSON (IAEA): Nuclear security costs have been factored into the cost estimates for many new nuclear facilities, but there is a need to look into the question of the costs of upgrading security at existing facilities. At present we cannot estimate nuclear facility security costs for an entire country. In this connection, I would note that it will undoubtedly be possible to meet some security concerns through engineering and other technological improvements in design.

LOOKING FORWARD: SUSTAINING THE PROGRESS

(Session 7)

Chairperson

V. KUTCHINOV
Russian Federation

NUCLEAR SECURITY CULTURE: THE KEY TO SUSTAINABILITY

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My boss, Senator Nunn, opened this meeting with scenarios meant to illustrate the dangers we face today from the use, and especially misuse, of nuclear material. The underlying reality of those alarming scenarios stems from the comparative ease with which nuclear material can be misused, to devastating effect. In considering the challenges of sustaining security of nuclear material, the good news is that protecting it is also comparatively easy — if we give it the priority it deserves.

My colleague, G. Allison, uses a compelling comparison: he notes, properly, that gold ingots do not go missing from Fort Knox, and that the Russian Federation does not lose jewels from the Kremlin Armoury. In other words, we have chosen to create reliable security around gold and diamonds, but we have yet to give similar protection to the raw material of nuclear bombs: plutonium — in any form — and high enriched uranium.

Why have we not yet taken these steps? After all, gold and diamonds have little intrinsic value. Throughout civilization, human beings have ascribed them instrumental value owing to their beauty, their rarity and their portable size. Gold and diamonds have value primarily as symbols — symbols of wealth and power, of love and fidelity, of the artist's skill. This is why my wedding ring is both priceless and useless, and why it threatens no one. Plutonium and uranium are even more difficult to create, and because of this fact the mere possession of nuclear material is perceived to confer prestige and power, but even more than gold and diamonds these materials have incredible intrinsic value: they can be made to yield heat and light. Properly controlled, this heat and light can sustain life, create wealth and expand the boundaries of human knowledge. In the wrong hands, the heat and light of a nuclear weapon can end millions of lives, devastate property, cripple economies, and poison our air, water and soil.

So again, I ask: why have we not yet achieved the 'gold standard' of security for nuclear material around the globe? Why do we not yet treat uranium and plutonium with the respect that their dual edged power deserves?

My only answer is that we have not yet made it a priority. It is not a matter of technology — it is a matter of human judgement.

It is all too easy to consider nuclear security in the context of hardware, on the one hand — barriers, cameras, alarms, tags and seals — and software, on the other — linking equipment into integrated systems to track material, detect and defeat intrusions, and discourage insider diversions. Much has been accomplished in broadening the application and increasing the sophistication of both hardware and software; these advances are to be applauded and continued.

Hardware and software alone, however, are not enough: the critical element is what the technology community calls wetware — “all [the brain’s] sparks and tastes and tangles, all its stimulus/response patterns” in the words of the science fiction writer who coined the term. In other words, the perceptions, judgements and actions of human beings, individually and in groups, are what make the difference in nuclear security. Unless the people involved in nuclear material management, from the janitor to the head of State, understand and respond to evolving threats, commit adequate resources, follow established procedures and are held accountable — unless the necessary wetware is in place — all the hardware and software in the world will not prevent nuclear catastrophe.

I would argue that the weak points of nuclear security are primarily connected to weaknesses in what we have come to call ‘nuclear security culture’. This phrase has been uttered often at this conference, including by M. ElBaradei in his opening address. Too few people involved in nuclear security have truly internalized the threats we face today, and are therefore not setting proper priorities. On the one hand, world leaders have declared the threat of nuclear terrorism to be the number one threat we face, and asserted that combating it is our top priority. Yet when we look at the obstacles to securing material at the pace demanded by the urgency of this threat, we can pick out many other priorities that are competing against this supposedly top priority — and winning. Some examples:

— Security officials in both the United States of America and the Russian Federation are being permitted to sacrifice progress on bilateral nuclear security cooperation based on Cold War era worries about theft of bomb designs. When we can each blow up the world several times over, these attitudes are at odds with the fact that our national survival depends on cooperation rather than confrontation.
— Lawyers in the USA and the Russian Federation have been permitted to sacrifice progress on nuclear security cooperation over disagreements about who would pay damages in far fetched scenarios of saboteurs

secretly embedded in the Western companies that are providing assistance to the Russian Federation's nuclear industry.

- Diplomats around the world are being permitted to fight the application of binding international standards for nuclear security in a misguided attempt to preserve sovereignty and national pride.
- Nuclear institute directors around the world are being permitted to maintain unnecessary stocks of nuclear material out of a misplaced sense of prestige or unrealistic plans for future experiments.
- Nuclear facility guards have been permitted to shut down alarm systems to avoid the annoyance of frequent false alarms and to leave their posts in order to forage for food.
- Research reactor operators around the world are being allowed to continue using high enriched uranium, despite the ready availability of alternative fuels for many of them.

By allowing these lesser concerns to 'beat' the so called top priority, we are all less secure. Truly sustainable nuclear security begins with the willingness, at all levels, to elevate nuclear security above these obstacles, even at the cost of real, but secondary, priorities.

Developing, promulgating and enforcing this primary priority of nuclear security depends on the interlocking security culture mechanisms of management, policies, personnel and training. Figure 1 shows the key components of a security culture mechanism.

Beyond these elements, intangibles such as honesty, integrity, commitment, learning and leadership also play critical roles. These social constructs reflect the realities of societies at large. After a decade-plus of US–Russian cooperation in material protection, control and accountability, projects are increasingly incorporating these cultural elements, as evidenced by the creation of nuclear security culture coordinators at many of the Russian sites where US assistance is being provided, and by the Bratislava summit statement.

Still, differences in US and Russian approaches to nuclear security continue to create challenges for these critical cooperative efforts. After a decade in which this cooperation has primarily taken the form of hardware and software, the wetware still does not match. Russian officials continue to consider sustainability to be primarily to do with hardware and software: replacement parts for installed equipment, upgrades for computer systems, maintenance of established security systems. US officials have begun to emphasize the wetware: reliable funding streams, commitment to follow procedures and a management culture that emphasizes the centrality of the nuclear security mission. The Nuclear Threat Initiative (NTI) has funded the

US and Russian Academies of Sciences to evaluate the progress of US–Russian cooperation in nuclear security towards 'indigenization' — in other words, making the transition from annual commitments of US funds to a system that is financed, maintained and managed by the Russian Federation in a way that responds effectively to evolving threats.

This process is likely to take some time, as well as some significant changes in Russian culture writ large. I. Khripunov and his colleagues at the University of Georgia — who have been working on nuclear security culture issues for several years — have analysed the application of these general principles in the Russian Federation, including the impact of its totalitarian past, its weak economy and ageing nuclear infrastructure, its fluid bureaucratic environment and its deep seated social challenges. The Russian Federation's nuclear complex cannot be isolated from this social context.

Nevertheless, there is room for optimism: recent statements on the risks of nuclear terrorism made by the head of the Russian Federal Security Service and the Chief of the General Staff seem to be stepping back from the traditional Russian approach of sweeping public denials of any risks to Russian weapons and material. To build on this progress, the recent University of

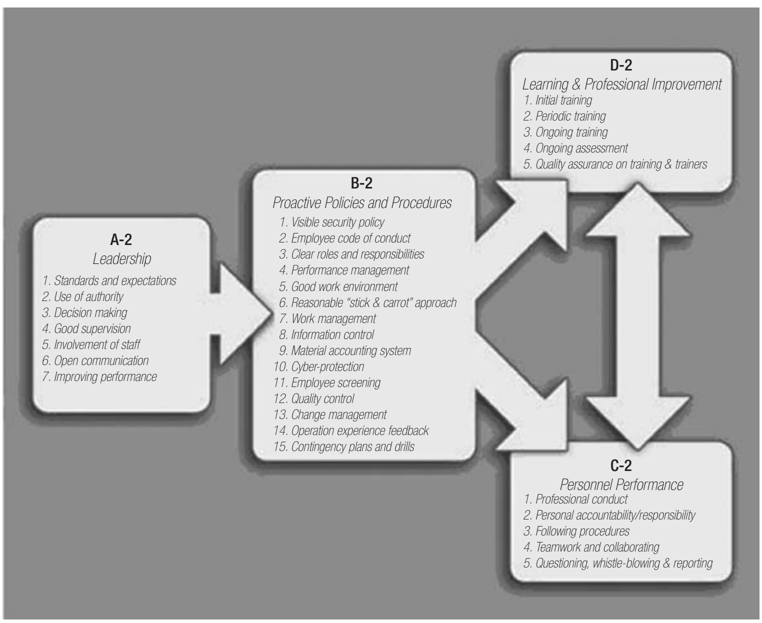

FIG. 1. Key components of a security culture mechanism. From Nuclear Security Culture: The Case of Russia (KHRIPUNOV, I., HOLMES, J., Eds), Center for International Trade and Security, University of Georgia, Athens, USA (2004).

Georgia study (available on the NTI's website at www.nti.org) recommends nine steps to improve security culture in the Russian Federation:

— Increase funding for security arrangements;
— Introduce more transparency;
— Accelerate nuclear security programmes;
— Make the legal basis more comprehensive and instructions more user friendly;
— Expand independent monitoring and oversight;
— Focus training on security culture;
— Encourage a system of incentives for personnel;
— Introduce a system of external evaluation and self-assessment;
— Develop public awareness programmes.

In highlighting these steps, we must recognize that the Russian Federation is far from being the only nation in which security culture needs improvement — ideally, this is a continuous, globally applied process of accountability and innovation. A supportive international environment would facilitate and expand the efforts undertaken by the Russian Federation and other countries to promote security culture. Several existing nuclear security institutions can be placed in service of this goal:

— The IAEA should use its leadership and authority to develop an internationally acceptable concept of nuclear security culture and launch appropriate information sharing and training programmes in selected countries. It should take the lead role in promoting this concept.
— The Global Partnership Against the Spread of Weapons and Materials of Mass Destruction, launched by the G8 but now numbering over 20 countries, is a valuable vehicle to raise the visibility of security culture for all countries with nuclear responsibilities. Non-US donors should incorporate these concepts in their cooperative efforts with the Russian Federation and other recipients as part of the goal to transform these relationships from patronage to partnership.
— United Nations Security Council Resolution 1540 can play a useful role in bolstering a nuclear security culture through its universal, mandatory application of "effective, appropriate" national mechanisms to prevent terrorist use of weapons of mass destruction. Its reporting provisions should be broadened to require information from countries about their efforts to cultivate security culture among nuclear personnel, in order to encourage them to give this concept the priority it deserves.

— The Institute for Nuclear Materials Management (INMM), an international professional organization for stewards of nuclear material, can help document and promulgate best practices in securing and accounting for nuclear material, a role initiated under a joint NTI–INMM workshop series bringing together nuclear material managers from around the world to share best practices.

We may find, however, that new institutions are necessary to fill in the gaps between formal, binding standards and the real threats we face today and in the future. This is why the NTI is exploring the concept of creating an organization of nuclear facility operators to apply best practices in nuclear material management around the world. Such an organization might be conceptually modelled along the lines of the World Association of Nuclear Operators, which provides training, peer reviews and information sharing related to the safety of operations of nuclear power reactors worldwide. A similar voluntary approach to improving nuclear material security might be considered as an adjunct to the more formal requirements of national regulations and international treaties. Such an organization would certainly emphasize the critical role of security culture in sustaining nuclear material security.

These steps will bring us closer to the gold standard of protection these materials demand of us. While we press forward to achieve this standard in time to prevent the devastation of nuclear terrorism, we must also realize the awesome timeframe over which this stewardship must be sustained: the half-lives of ^{239}Pu and ^{235}U, respectively, are 24 000 years and 713 million years. A deep seated understanding of the power of these materials is the only path to this kind of sustainability.

FUTURE CHALLENGES OF REGULATORY BODIES IN SUSTAINING THE PROGRESS IN NUCLEAR SECURITY

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The development prospects of the nuclear industry are an important issue for all of us. The priorities of the nuclear sector change over time. Development in the field of the use of atomic energy is not possible today without appropriate measures to prevent uncontrolled use and proliferation of radioactive material, and measures for the physical protection of facilities posing a nuclear or radiation risk.

At one of the early stages, considerations of State security were resolved by creating nuclear weapons. In the ensuing political confrontation, as technology evolved in the industrially developed countries, issues of secrecy and confidentiality of information became a priority.

In modern society, the rights of the individual have indisputable priority, and one of the most important is an individual's right to health and to live in a safe world. Achieving this is impossible without taking measures to forestall the threat of accidents at facilities posing a nuclear or radiation risk and to prevent uncontrolled use and proliferation of radioactive material and nuclear technology.

Progress in the use of atomic energy in our modern high technology society will depend to a large degree on the extent of public trust in the activities of the organizations, specialists, politicians and officials whose responsibility it is to take decisions in this area. The development of the mass media and the rise in educational standards make safety and security issues, which were previously the preserve of a narrow circle of specialists and politicians, accessible to a wide circle of people.

Currently, nuclear and radiation safety and the security of nuclear material and radioactive substances (achieved using accounting, control and physical protection measures) are viewed as independent factors at a facility to prevent an accident or to contain the consequences of an accident. This differentiation is based on the difference between the means for ensuring nuclear and radiation safety, on the one hand, and the forces and means for ensuring accounting, control and physical protection of radioactive material, on the other. This differentiation pits these two aspects against one another and can lead to unfounded decisions when establishing priorities in the provision of resources for maintaining safety and security; that is, accounting, control and physical protection systems.

The threats which have emerged nowadays as a result of increased terrorist activity by extremist forces and groups show that facilities related to the use of atomic energy, because of the potential hazard they represent, are becoming increasingly attractive as targets for sabotage or means of blackmail.

When considering the result of an accident or theft of radioactive material, the initiating incident is not so important, whether it be an unintentional error on the part of staff or a planned unauthorized action by a perpetrator on the inside or outside. What is important is to maintain a balance between the level of operational stability and protection against unauthorized actions.

It is becoming increasingly obvious that a facility related to the use of atomic energy can only be considered safe when both its nuclear and radiation safety and its protection against unauthorized actions are assured. A few examples are the following:

— Insufficient coordination between or badly organized interaction of a facility's security forces and its staff are in themselves a threat to the safety and security of a facility.
— It is not just the radioactive material itself that needs to be protected from unauthorized action, but also items of safety equipment and elements of the physical protection system.
— Protection against the actions of a perpetrator on the inside or outside is an obvious aim of the physical protection system. However, protection must also be provided against involuntary or erroneous action by any staff member, including security staff.
— A facility employee or a member of his or her family could fall prey to blackmail by terrorists and therefore become a threat to the facility.

Russian legislation is founded on the principle that safety and security must be harmonized. On the one hand, it places the entire responsibility for ensuring nuclear, radiation and technical safety, and accounting for and control of radioactive material and physical protection, on the operating organization, and, on the other hand, it endows Rostekhnadzor with the powers to regulate all these matters.

The function of Rostekhnadzor is to establish an exhaustive set of safety and security requirements incorporated in federal standards and the regulations it approves, and in licensing conditions. It is Rostekhnadzor's responsibility to ensure that these requirements, if met, maintain the best achievable balance between all safety and security factors.

The prerequisites for the efficient operation of any national regulator, including Rostekhnadzor, are:

— Independence of organizations carrying out activities in the field of the use of atomic energy.
— Sufficient powers, established via legislation, in the field of safety and security regulation.
— The financial and technical resources needed for its main activities.
— Availability of a stable infrastructure allowing for professional training and staff improvement.
— Availability of a pool of staff in the organization itself and a reserve of staff to maintain the stable operation of the organization.

Rostekhnadzor is making considerable efforts at the practical level to achieve, in practice, a balance between safety and security in the system for ensuring safety and security in the field of the use of atomic energy as a whole and at facilities under its supervision.

Rostekhnadzor interacts extensively with scientific and industrial organizations in the Russian Federation. This interaction allows Rostekhnadzor to keep up with the latest developments in industry and to formulate objective directives to increase safety and security, and results in practice in a constant increase in the level of regulatory requirements. Licensing and supervisory activities are constantly being improved.

It should be noted that Rostekhnadzor receives considerable help in this area from overseas partners, primarily the US Department of Energy. As part of the cooperation with the US Department of Energy, large scale programmes are being implemented to improve the regulatory infrastructure and supervisory activities, in the course of which the problem of harmonizing safety and security is also being resolved.

Attaching as it does great importance to the problem of harmonizing safety and security, Rostekhnadzor exchanges regulatory experience through international cooperation, and intends to continue to do so in the future.

One way we would propose of developing this cooperation is to broaden the scope of Rostekhnadzor's annual international conferences in the Russian Federation on the prevention of illicit trafficking in radioactive material to include matters related to safety and security synergies.

MAINTAINING WORKFORCE STAFFING AND COMPETENCE

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Abstract

The French nuclear security system is a performance based system in which the nuclear operators have responsibility for the security of the nuclear material held in the facilities they operate. These operators have a choice of the means they use to fulfil their security obligations. Among the three main operators, two have decided to recruit and train their own staff, and the third has signed an agreement with the gendarmerie. Maintaining a high level of vigilance is an important and vital challenge, for which the management of the nuclear facilities is responsible and accountable. Flexibility, management support and commitment and repeated exercises are good means to reach this goal. However, no security system is appropriate unless the whole staff, those directly involved in security or otherwise, share a high degree of security culture.

1. KEY PLAYERS IN THE FRENCH NUCLEAR SECTOR

1.1. Two authorities

The General Directorate for Radioprotection and Nuclear Safety, which works under the joint authority of three ministers — the Minister of Environment, the Minister of Industry and the Minister of Health — is in charge of nuclear safety. It is the nuclear safety authority. The High Official for Defence at the Ministry of Economy, Finance and Industry deals with nuclear security. The two organizations are clearly separated, since they are in charge of quite different missions.

Both entities rely on the technical support of the Institute for Radiological Protection and Nuclear Safety. For security matters, the Directorate for Defence Nuclear Expertise of this institute is the technical support for the High Official for Defence and works almost only for it. This directorate provides high level engineers specialized in the physical protection of nuclear material, sites and transport, and nuclear material accountancy. As experts, they carry out control and inspection operations for the High Official for Defence.

1.2. Three major nuclear operators

In France about 250 facilities are currently authorized to hold nuclear material. These facilities are mainly operated by three major nuclear operators:

(a) Commissariat à l'énergie atomique (CEA), which is mostly responsible for research;
(b) COGEMA, which deals with the whole nuclear cycle, from extraction to recycling;
(c) Electricité de France (EDF), which operates 58 reactors in 19 power plants.

2. PERFORMANCE BASED SECURITY SYSTEM

The French system is based on the responsibility of nuclear operators for the security of nuclear material held in the facilities they operate, under the supervision of the High Official for Defence at the Ministry of Economy, Finance and Industry, who is in these matters a regulator but is also in charge of controlling and inspecting the fulfilment of his or her instructions.

2.1. Operators' duties

The law states that operators are responsible for the security of the nuclear material that they are authorized to hold. More specifically, the nuclear operators must be able to:

(a) Prevent any intrusion into their facilities or any unauthorized diversion of nuclear material from these facilities;
(b) Detect any intrusion or attempt of unauthorized diversion;
(c) Call response forces (police, gendarmerie) in the event of an incident;
(d) Contain any attack until the response forces arrive.

The nuclear operators are responsible for the means they choose to use (types of detector, barriers, guards, etc.), but they have an obligation to meet the required objectives and to demonstrate the effectiveness of their protective measures. They are required to produce security reports, which are subject to evaluations both on and off the site. These evaluations determine the size of grants paid.

2.2. Supervision by the High Official for Defence

The High Official for Defence at the Ministry of Economy, Finance and Industry ensures that the operators fulfil their obligations and verifies the means they use for this fulfilment. For this supervisory mission, the High Official for Defence has around 50 specialized inspectors at his or her disposal.

3. TWO DIFFERENT APPROACHES CHOSEN BY THE OPERATORS

To fulfil their obligations, the nuclear operators chose two different approaches:

(a) The CEA and COGEMA decided to rely on their own staff and to recruit special guards, called formations locales de sécurité (FLS);
(b) EDF decided to rely on public forces for interventions, and signed an agreement with the French gendarmerie.

3.1. Formations locales de sécurité

3.1.1. Mission

The CEA and COGEMA recruit guards to be responsible for security and safety in their nuclear facilities, and more precisely for:

(a) The physical protection of nuclear material;
(b) The physical protection of facilities;
(c) Control of access to facilities, including checking individuals and vehicles;
(d) Relations with police forces and for calling them in the event of an incident;
(e) Intervention in the event of an alarm;
(f) Fire safety;
(g) First aid.

If the problem cannot be handled by the FLS alone, they call upon public forces such as the gendarmerie, police, fire department, etc., according to the difficulties they meet. In the event of an attack against a site, the FLS is responsible for preventing aggressors from reaching nuclear material and for keeping them on the site in order that the gendarmerie or the police can arrest them. In the event of a serious incident or terrorist attack, the RAID, the police special response team, will be the unit ultimately in charge. In such cases, the FLS will be at the disposal of the public authorities.

3.1.2. Profile

Guards recruited to the FLS are usually young (25–30 years old). They must be in very good condition, well educated, highly motivated and trained. They often come from the same background: police, military, fire brigades.

3.1.3. Regulatory situation

The guards of the FLS are regulated under the law on private security activities. They are authorized by the local prefect, must have security clearance and take an oath before a judge. They are allowed to carry firearms and have access to classified information and are under strict supervision.

3.1.4. Training

The guards receive a very comprehensive training. They first attend an eight week initial training course and then undergo ongoing training, with regular training periods in every field of competence.

The training covers:

(a) Knowledge of:
 - (i) Facilities;
 - (ii) Means of physical protection, detection and communication;
 - (iii) Means of prevention, detection and intervention in the field of fire safety;
 - (iv) Equipment, especially weapons;
 - (v) Self-defence, control techniques, etc.;
 - (vi) The various interventions that can be needed.

(b) First aid (the guards must obtain a first aid certificate issued by the services of the local prefect).

(c) Knowledge of procedures.

Some guards attend additional and specialized training, for example to become a first aid instructor, shooting instructor (training provided by the police) or dog handler (training provided by the military).

The guards must take part in sport in order to keep fit and take part in exercises (shooting practice or fire drill, for example). From time to time, common exercises with the police, gendarmerie and/or fire brigades are organized.

The training and performance of the FLS are checked by the High Official for Defence at the Ministry of Economy, Finance and Industry, who can ask for exercises involving the FLS only or the FLS and the police, gendarmerie and/or fire brigades.

One important challenge is to keep these teams operational. Managers need to develop comprehensive programmes in order to maintain a high level of motivation. In-house training is one part, but it is important also to give to these guards a clear view of their future. Some guards stay in the FLS as supervisors, while others are redirected to other forms of employment when they reach the age of 45 or 50. Opportunities for training and positions dealing with other nuclear matters are then proposed to them.

3.2. Security system at Electricité de France

EDF chose not to have its own on-site armed guards and relies instead on private companies to detect any problem and call the gendarmerie. These companies are of course strictly selected and have, like the personnel they employ, security clearance.

The guards are not armed and are in charge of monitoring different surveillance systems and, if necessary, stopping aggressors by closing heavy doors, using various specific devices and calling the gendarmerie. Of course, they also receive comprehensive training about the job they perform.

The facilities are protected with multiple physical obstacles in order to prevent any attack and/or to delay any attempt of aggression until intervention by the gendarmerie.

The gendarmerie is in charge of every intervention on the site in the event of an attack. Dedicated gendarmerie agents are posted outside, but close to, the facilities. According to a special agreement, the gendarmes have forces ready 24 hours a day for a first quasi-immediate intervention. In the event of difficulties, additional gendarmes can be sent very quickly to the site to handle the problem. In the event of a serious or terrorist attack, it is the responsibility of the GIGN, the gendarmerie special response force, to rush to the site and take control of the situation.

4. HOW TO MAINTAIN VIGILANCE AND RESPONSE CAPABILITIES?

It is fundamental to keep a keen vigilance on sites and to be able to perform quick and efficient responses 24 hours a day. With this aim, it is very important for the operators to have a flexible staff. Competently and specifically trained for fire safety as well as for first aid operations, the guards, armed or not and whatever their status, stay more vigilant and are less subject to boredom than if they were responsible only for security.

The management — from the site director to the squad chief — also needs to be careful to keep a high level of vigilance. Middle management is key to this. Each level of management has to ensure that the staff in charge of these — sometimes tiresome — missions is kept trained and motivated. A good way for this is to organize regular exercises. Each operator has to organize internal security exercises, some of which are simple procedures and checks, while others can consist of tests, such as bringing a false weapon into a facility or taking nuclear material from a facility. Other exercises can also be organized with the involvement of the local police or gendarmerie. Some of these exercises are announced to the staff, while others are unexpected. Unexpected exercises and drills can also be organized by the High Official for Defence inspectors themselves during an inspection.

Finally, the High Official for Defence has to organize every 18 months a major exercise called an exercice de protection et d'évaluation de la sécurité (exercise of protection and of security assessment), which involves the local administrative authorities and various police and gendarmerie services, and at the end the intervention of special forces. For the time being, the aim of this exercise is to check the links between the operator's and the public authorities' procedures as well as the reactive capacities of each player.

Clearly, these exercises contribute to maintaining a high level of interest and motivation by creating areas for research and improvement in these matters.

5. THE NEED TO SPREAD A SECURITY CULTURE

Important though security guards are, no system is adequate unless the security culture is shared by the entire staff. The real challenge is to bring about the same level of security culture as of safety culture. Most staff have a technical or scientific background, so they know the risks associated with nuclear material. However, not all have a security awareness regarding the physical protection of nuclear material and facilities.

Beyond the role of the State authorities, the responsibilities of the operators and the activities of the security guards, all staff must be involved in the security of nuclear material. This implies at least making all individuals working in nuclear facilities sensitive to the risks, asking them to be vigilant and informing them how to react in the event of an incident. This is a question of training, of persuasion and, in fact, of management.

To conclude, we need to remember what Thucidyde, the Greek historian, taught us 2500 years ago: that the defence of a city does not rely just on the thickness of its walls, but above all on the commitment of its citizens.

VALUE OF TECHNOLOGY FOR DEVELOPMENT

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We are gathered here for the purpose of sharing our experiences, working together and helping each other in order to chart a course of direction to more effectively utilize nuclear energy for sustainable development, while ensuring that it is used by authorized institutions worldwide. We believe that increased, but proper, use of this energy resource is bound to lead to a more prosperous, peaceful and secure world.

At first glance it would seem out of place to dwell upon a rather broad theme, Value of Technology for Development, during a conference dedicated to the issues of security against abuse of nuclear technology. However, it makes good sense to recount the enormous benefits which demand continued use of this technology in spite of a myriad of concerns.

Many of the concerns mentioned earlier are important. As such these concerns need to be addressed effectively — the earlier the better. However, we need to chalk out strategies for averting the risks associated with the widespread use of nuclear technology as well as encourage the utilization of this bounty of nature for accelerated development of the poor countries.

I will limit my submissions to nuclear technology only. However, there are other technologies, such as biotechnology and information technology, which are expected to transform the patterns of development in a fundamental way in the coming decades. While limiting the scope of my presentation in this sense, I would like to make an essential addition to the requirement of development by emphasizing its sustainability.

It is all too important that present needs are met without compromising the ability of future generations to meet their needs. In my view, the development of nuclear technology becomes necessary when viewed in terms of its impact on a longer time scale.

This conference is of special significance and appropriately timed. I would like to take this opportunity to recall what US President Eisenhower, a great visionary, said in his famous Atoms for Peace speech in December 1953 while proposing the creation of one of the sponsors of this conference — the IAEA. He stressed the need to apply nuclear energy to the needs of agriculture, medicine and other peaceful activities.

When we see the world around us, it has come a long way in the past half century. We now have 441 operating nuclear power plants providing about 17% of the world's electricity needs. Using this clean source of energy is avoiding addition of millions of tonnes of greenhouse gases annually. Tens of millions of patients are being diagnosed and treated for cancer-like ailments around the world every year. Credit for the amelioration of suffering of such a large number of human beings goes to practitioners using nuclear energy to serve humanity. Hundreds of millions of tonnes of agricultural output the world over also depends on appropriate use of nuclear energy.

All this activity contributes to development and prosperity. However, we note that the greatest use of nuclear energy is taking place in the developed world.

Energy, especially electricity, is universally recognized as a major contributor to development. Per capita income and energy consumption are considered as key indicators of economic development. At present, Pakistan's per capita income of $650 is very low compared with the world average. The per capita primary commercial energy consumption of 0.30 tonne of oil equivalent (toe) is also about one fifth of the world average of 1.55 toe.

While the world's population is expected to grow from 6 billion to 10 billion by the middle of this century, much of the increased use of nuclear energy is expected to take place in the developed world. The population increase is expected to be much greater in the poor developing world. As such, the rich–poor gap is expected to widen, not only in economic terms but much more so in the use of advanced technologies, and particularly in the use of nuclear technologies.

Widening of the rich–poor gap is bound to create frustrations, particularly when access to information is increasing exponentially. Television and the Internet are beaming pictures of luxurious living in comfortable surroundings in the developed world to shanty towns in remote villages. One has to be among them to realize its full impact. Adding to the poor's perplexity in the developing world, where malnutrition is on the increase, and unless we act will increase even further in this century, are discussions in the media on obesity caused by abundance and indulgence in the affluent sections of the world.

We in Pakistan feel that all of us in the world, the more fortunate ones as well as the less fortunate ones, owe it to posterity to devise means to reduce this disparity, which is on the increase. We feel that the responsibility lies both with the developed world as well as with those aspiring to be developed. Just doling out aid or cash are short term measures. The solution lies in innovation, devising new mechanisms for sharing of technology, thereby increasing production and prosperity in the developing world. This is bound to enhance peace and security.

In the developed world it means removing barriers on technology transfers, on purchase of equipment, particularly dual use, on increasing training opportunities and mutually advantageous sharing of intellectual property.

The developing world also has a stake in development. It needs to move away from the aid culture, of expecting handouts and investing in discarded and obsolete technology. It needs to make investments in its human resources, set up institutions and infrastructure to develop knowledge, technology and gadgetry. This would be an honourable way to march forward with confidence and dignity.

It is thus that technology can lead to development. Institutions such as the IAEA and World Nuclear University are playing important roles already. A similar foresight by the Nuclear Suppliers Group in opening the doors of technology to the developing world would provide the necessary impetus to accelerate development.

We in the developing world also have a great responsibility in the safe and secure use of this powerful and concentrated energy source for the benefit of humankind. We have to treat this powerful energy source with the respect and attention it deserves. Security needs to be made foolproof and institutional mechanisms strengthened where needed.

Pakistan has an excellent record in nuclear safety, and a highly effective security system is in place. Stringent export controls are enforced. Lately we have significantly increased security at our nuclear installations, achieving defence in depth, utilizing multiple and diverse barriers. We would like to strengthen the security of our nuclear installations even further. This is why we need to acquire high technology security systems. This also reinforces what I said earlier. Removal of embargoes and access to technology would significantly increase confidence in our ability to use nuclear technology for development while addressing security concerns more effectively.

Pakistan attaches great importance to safety and security in its nuclear facilities. We have a well established and totally independent regulatory body called the Pakistan Nuclear Regulatory Authority (PNRA). In its scope, authority and independence it is a leader in the region, and comparable with the best in the world.

Pakistan has also established stringent export controls on nuclear related items and an effective mechanism is in place.

Our contention is that nuclear technology is indispensable for progress and that there are technological means available to obstruct its misuse, and that a joint effort is needed to spread its benefits with minimal possible risk of deliberate or accidental harm.

Pakistan has recently joined the World Nuclear Association. We are active members of the IAEA, World Association of Nuclear Operators (WANO) and CANDU Owners Group (COG) and appreciate the tremendous sharing of knowledge that takes place in these forums. However, we also have to face embargoes, restrictions and denial of information and technology.

Both of our nuclear power plants are under IAEA safeguards and we have fully cooperated with the IAEA in the implementation of these safeguards.

There is a global need for wider and closer interaction among the different nations of the world in the nuclear technology fields, in particular nuclear power. Pakistan would be a very active participant in any initiative in this direction.

The saying ‘knowledge is power’ is well known. Sharing of knowledge multiplies its advantages manifold, and the benefits that accrue from this sharing increase in geometric proportions.

The nuclear power industry worldwide has seen tremendous improvements in reliability, availability and sustainability. In the OECD countries, for example, where embargoes on technical and material exchange do not apply, in the period 1986–2002, while the number of operating nuclear power plants increased by 10%, from 324 to 355, the electricity generated increased from 1372 TW(th) to 2309 TW(th), an impressive increase of 68%. This is the advantage of knowledge sharing.

Nuclear power is undergoing a renaissance. Impressive growth is visible, particularly in Asia. In the United States of America too, a strong revival is taking place. We in Pakistan share the same vision for meeting our energy needs to combat poverty. As such we have plans for a larger nuclear power programme.

Pakistan is very fortunate in having the support of the international community in its efforts to apply nuclear energy in agriculture, medicine and industry. As a result of this international collaboration and knowledge sharing, Pakistan has benefited tremendously in the development of new varieties of various agricultural crops. Our cotton and rice exports have increased and contributed significantly to increase our gross national product. Additional income of some $100 million per year is estimated from crops developed by nuclear techniques at our four nuclear agriculture institutes. With this kind of money, 1–2 small to medium sized nuclear power plants can be added every decade. In the field of agriculture, Pakistan has shared its development with many countries through the IAEA.

In the field of health care, knowledge sharing has increased our grasp of nuclear diagnostic and therapeutic techniques. In the process we have set up 13 nuclear medical centres all over Pakistan. Nearly a million patients have been treated at these centres in the past three years. A sizable fraction of the patients in centres located near the Afghan border were refugees from that country. The fees charged at these medical centres are nominal, and in most cases the treatment is free. We are in the process of setting up five additional such centres. We are providing hands-on as well as academic training leading to master of science nuclear medicine degrees to professionals from many countries.

Pakistan started work on its first nuclear power plant as long ago as 1965. While we are among a select group of countries, with 34 years experience in the generation of nuclear electricity, we wish that our nuclear power plant KANUPP had a higher capacity factor. While we have had access to operational experience and safety related information, KANUPP's availability has been low because of denial of equipment and services.

We feel that denial of this equipment has been unreasonable. We are left with no option but to operate and maintain KANUPP on our own. The safety related assistance provided by the IAEA, WANO and COG is highly appreciated.

Our second nuclear power plant, CHASNUPP-1, began operation in September 2000 and lately has had a 95% availability factor. We have plans to start work on its twin in the near future. Installation of the second unit at Chashma would boost the economy, creating many more jobs. During the past three years our nuclear power generation has avoided the release of about 4 million tonnes of carbon dioxide; a small, but nevertheless significant, figure.

We have demonstrated the capability to operate nuclear power plants safely for 34 years. We need to set up many more. We know that these plants will help generate jobs, accelerate economic development and bring smiles to our people. It would also help in reducing greenhouse gases.

How can we enhance sharing of nuclear energy and associated knowledge? In addition to cooperation in the related fields of agriculture, medicine and industry, the greatest impact of international cooperation is in nuclear power generation. There is, and has been, substantial cooperation in nuclear power technology between, among others, industrial giants in the USA and utilities in France, Japan and the Republic of Korea. Subsequently, there has also been cooperation between France and China. We in Pakistan look forward to such cooperation.

With the indisputable record of nuclear technology rewards, no one would want to curb its wider utilization, except of course where there is a real threat of subversive action or indications of aggressive purposes.

Fortunately, there are technological and legal options available to eliminate this threat. What is needed is a will to join hands in making these solutions work. On the part of the custodians of technology, a generous approach is needed in sharing it with those who badly need it. The developing countries need to adopt measures to alleviate any fears in this regard.

We do understand the concerns that some governments have on nuclear proliferation in the world. Many countries desperately need nuclear power. We therefore need to find a way out.

We would like to suggest joint ventures for setting up nuclear power plants in Pakistan. To alleviate proliferation and other concerns, nuclear power plants can be treated in a special manner. One or more nuclear power plants could be constructed in a designated zone, the boundaries of which are specially secured and safeguarded to the satisfaction of all concerned. This could be a solution for Pakistan, among others.

Like fire, atomic energy can be exploited towards ends that are peaceful or otherwise. The decision to use it for peaceful purposes is governed by the desire for development and prosperity. Attention towards non-peaceful use is diverted because of security threats.

Technology sharing leads to a win–win situation for all, with benefits to the world as a whole. Technology sharing increases business worldwide. Egalitarianism is enhanced through reduction in the rich–poor gap, which will enhance peace, prosperity and security all over the world. The global village concept could be realized much earlier. May I therefore suggest that we resolve to usher in an era of safe and secure nuclear technology for posterity. This needs sharing of knowledge and technology. It will boost industrial output, create more jobs and contribute to peace, prosperity and security worldwide.

DISCUSSION

A. DJALOEIS (Indonesia): My country would welcome the establishment of a regional association of nuclear regulators covering the ASEAN (Association of South-East Asian Nations) region. As a result of the atomic bomb attacks on Hiroshima and Nagasaki, people are aware of what the consequences of a major nuclear safeguards failure might be, and, as a result of the Chernobyl accident, people are aware of what the consequences of a major nuclear safety failure can be. As there have so far been no terrorist attacks with dirty bombs, however, that degree of awareness does not exist with regard to nuclear and radiological security. There is a need to promote greater awareness of the importance of nuclear and radiological security. At present, if I were to press for higher levels of nuclear and radiological security in Indonesia, I would probably be told that the country has more important priorities.

C.W. COATES (United States of America): At this conference there has been a lot of talk about the importance of nuclear security sustainability. However, people have widely varying ideas about the meaning of the concept and about how sustainability might be achieved in the nuclear security area. In my view, an effort should be made to bring about a consensus as to what nuclear security sustainability means and how it might be achieved.

S. FERNÁNDEZ MORENO (Argentina): In my opinion, nuclear security culture should not be treated as a concept distinct from nuclear safety culture. Our ultimate goal is to protect people from the harmful effects of ionizing radiation. To achieve that goal, we need, above all, knowledge of those effects, whether the radiation exposure is due to a terrorist attack or an accident.

N.J. DIAZ (USA): In agreeing with Ms. Fernández Moreno, I would say that nuclear safety culture is the foundation of nuclear security culture and that nuclear safety culture already exists, and, on the question of sustainability, I would say that it means maintaining a strong nuclear safety network, which will result in a strong nuclear security network.

While I have the floor, I should like to pick up on a question about costs asked by Mr. Mote during Session 6. The costs of nuclear security measures are high. For example, in the civilian nuclear sector in the USA, licensees have during the past three years spent about $1100 million on such measures — and we in the US Nuclear Regulatory Commission have spent about $250 million more. Given the high costs of nuclear security measures, it is important to prioritize, doing the most important things first.

E.S. LYMAN (USA): In ‘force on force’ exercises at nuclear facilities in the USA, the ‘terrorists’ often overcome the armed guards very quickly, so it is a requirement that the armed guards have weapons comparable with those which real terrorists are likely to use. Consequently, I am surprised that — according to what Mr. Plaisant has said — Electricité de France has chosen not to have armed guards at all on-site at its facilities. Also, I am surprised that 'force on force' exercises are not carried out at nuclear facilities in France.

E. PLAISANT (France): You might say that the organization of 'force on force' exercises runs counter to French culture. Numerous exercises of other kinds are carried out, with ambitious scenarios and stringent monitoring and analysis, and I believe that they meet our needs. That having been said, I would very much like to attend a 'force on force' exercise in the USA.

GLOBAL DIRECTIONS FOR THE FUTURE

(Session 8)

Chairperson

T. TANIGUCHI
IAEA

FINDINGS OF THE PRESIDENT OF THE CONFERENCE[1]

The conference recognized that prevention of the malicious use of nuclear and other radioactive material and of the sabotage of nuclear installations has been a feature of the programmes of the IAEA, States and international organizations for several years. These activities were expanded somewhat in the mid-1990s as a result of a number of illicit trafficking incidents, but the terrorist attacks in 2001 in the USA were a wake-up call that alerted the international community to the need to significantly enhance the protection of nuclear and other radioactive material from coming into the hands of criminals or terrorists and being used in malicious acts. Subsequent events in Spain, Indonesia and the Russian Federation have shown that the threat has not diminished since 2001. The international community has reacted strongly and taken several initiatives aimed at preventing nuclear or other radioactive material from falling into the hands of criminals and terrorists. These initiatives include:

- The IAEA Nuclear Security Plan of Activities;
- United Nations Resolution 1373;
- United Nations Resolution 1540;
- Strengthening the Convention on the Physical Protection of Nuclear Material (CPPNM);
- Code of Conduct on the Safety and Security of Radioactive Sources (Code of Conduct);
- G8 Global Partnership Against the Spread of Weapons and Materials of Mass Destruction;
- EU Strategy Against the Proliferation of Weapons of Mass Destruction;
- Global Threat Reduction Initiative.

The International Conference on Nuclear Security[2]: Global Directions for the Future was convened by the IAEA in cooperation with the European Union, the European Police Office, the International Criminal Police Organization, the Organization for Security and Co-operation in Europe and the

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[1] The views and recommendations expressed here are those of the President of the Conference and the participants, and do not necessarily represent those of the IAEA.

[2] Nuclear security: The prevention and detection of, and response to, theft, sabotage, unauthorized access, illegal transfer or other malicious acts involving nuclear material, other radioactive substances or their associated facilities.

World Customs Organization, and was hosted by the Government of the United Kingdom. The conference considered the threat of malicious acts involving nuclear and other radioactive material; the experiences, achievements and shortcomings of national and international efforts to strengthen the prevention and detection of, and response to, malicious acts involving these materials; and the ways and means to achieve future improvements.

FACING THE CHALLENGES

The conference noted that nuclear terrorism is one of the greatest threats to society. The threats remain the same in nature as they were three years ago; however, the international community and individual States have made important progress in their level of preparedness in preventing, detecting and responding to these threats. The threats involve criminals or terrorists acquiring and using for malicious purposes (a) nuclear explosive devices, (b) nuclear material to build an improvised nuclear explosive device, (c) radioactive material to construct a radiological dispersal device (RDD) and/or (d) the dispersal of radioactivity through sabotage of installations in which nuclear and other radioactive material can be found or of such material in transport. The periodic reports of illicit trafficking in nuclear and other radioactive material, as well as reports that terrorist organizations have shown interest in obtaining this material, make clear that there is no room for complacency. The political and economic consequences, as well as the health impacts, of a successful malicious use of radioactive material could be devastating. There is a distinct belief that the response to date is not commensurate with the potential consequences of these threats.

In facing these challenges, the conference recognized that the international community must continue to work to identify specific threats; share and make the best use of the information available about illicit nuclear trafficking and other nuclear security related events; strengthen prevention against such acts; raise the level of awareness of the need for nuclear security among senior officials; and maintain the confidentiality of the sensitive information involved. The relationships and synergies between security, safety and safeguards should be recognized and taken into account in the development of nuclear security programmes.

ENHANCING THE GLOBAL NUCLEAR SECURITY FRAMEWORK

The conference noted that instruments that underpin the international nuclear security framework include the CPPNM, the Code of Conduct, other relevant conventions, and safeguards agreements and additional protocols that IAEA Member States conclude with the IAEA.

High priority should be given to expeditiously strengthening the CPPNM, which will be discussed at a diplomatic conference to be convened in July 2005. The strengthening of the CPPNM represents a significant step forward for nuclear security. An amended CPPNM can guide the enhancement and updating of the IAEA's existing programmes of assistance to States in the area of nuclear security and in the development of new initiatives. The conference recognized that consideration should be given to revising INFCIRC/225/Rev.4 following the conclusion of the CPPNM diplomatic conference. More than 70 States have declared their intention to implement the Code of Conduct. Further discussion of policy and technical issues of relevance for the Code will be held in Bordeaux in June 2005.

Continued and enhanced efforts are needed to provide for the full and effective implementation of the CPPNM and Code of Conduct, facilitated by the establishment of IAEA nuclear security guidelines and recommendations.

STRENGTHENING NUCLEAR SECURITY IN STATES

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

PRIORITIES FOR STRENGTHENING NUCLEAR SECURITY

The priorities for strengthening nuclear security include continued efforts to enhance the prevention of terrorist acts and the physical protection and accountability of nuclear and other radioactive material, in nuclear and non-nuclear use, storage and transport, throughout the life cycle, in a comprehensive and coherent manner. A graded approach to security should continue to be used under which more stringent controls are applied for material or activities that pose the highest risk; for example, particular attention should be given to high enriched uranium or plutonium. The work towards developing effective approaches, methodologies and equipment for prevention, detection and response must continue. Each of these aspects has an important contribution to make in developing an effective national nuclear security programme.

SUSTAINABILITY AND NUCLEAR SECURITY CULTURE

The fundamental principles of nuclear security include embedding a nuclear security culture throughout the organizations involved. By the coherent implementation of a nuclear security culture, staff remain vigilant of the need to maintain a high level of security. While the concept of a security culture is similar to that of safety culture, it is recognized that there are substantive differences in the assumptions and principles that underpin security culture. An effort should be made to ensure that the two cultures complement rather than conflict with one another.

The long term sustainability of nuclear security efforts is a primary concern. The investments made in States, through their own efforts and through assistance programmes, must be sustained in order to continue to upgrade or maintain an adequate level of security. While the level of threat may change from time to time, an effective level of nuclear security must be appropriately maintained.

IMPROVING REGIONAL AND INTERNATIONAL COORDINATION AND COOPERATION

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

ROLE OF THE IAEA IN UNDERPINNING THE GLOBAL EFFORTS

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

The conference recognized the value of developing a systematic and structured approach to help establish effective nuclear security in each country. It requested the IAEA to work towards the development of a specific series of documents outlining and supporting the elements of this approach as a matter of importance.

The conference urged the IAEA to continue its efforts to:

- Support full implementation of the CPPNM and the Code of Conduct.
- Establish a comprehensive set of nuclear security guidelines and recommendations.
- Help States to improve their regulatory and technical nuclear security systems.
- Coordinate its efforts with those of other bilateral or multilateral assistance programmes. Integrated nuclear security support plans can be used to ensure this coordination.
- Advise Member States on the importance of becoming party to international instruments relevant to combating nuclear terrorism, and to help States as needed in their efforts in that direction.
- Promote research and development on more effective nuclear security approaches and techniques.
- Promote the enhanced exchange of nuclear security relevant information.
- Take an active role to facilitate effective cooperation and coordination at the international and regional levels.

The view of the conference was that these expanded IAEA efforts will likely require financial resources above those predicted in 2002. Optimal coordination and cooperation with, inter alia, bilateral assistance programmes will significantly enhance the impact of available resources, avoid duplication and identify gaps for improved efforts.

LOOKING FORWARD: SUSTAINING THE PROGRESS

The conference expressed the view that a clear focus and concentrated efforts for the following actions are essential:

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

A follow-up international conference should be convened within five years.

DISCUSSION

T. TANIGUCHI: Reflecting on the discussion in Wednesday's Opening Session, in which Senator Nunn graphically presented the challenge of threats to nuclear security, and the consequences if we fail to rise to that challenge, the themes of the conference — stressed by IAEA Director General M. ElBaradei and by Baroness Symons — have been tackling the challenge and coordinating the effort to do so. As Baroness Symons said, our aim at this conference was to consider how we can best adapt our non-proliferation machinery to address and eventually overcome global terrorism. We cannot afford just to look back; we have to consider new approaches and strategies.

A very strong theme has been sharing experience and best practice, so I hope that the conference has itself served an important purpose in bringing people together to learn from each other, to make new contacts and to create opportunities for the future. When you leave here, I hope that you will be able to build on that so that this conference will have served as a turning point between past and future.

Unfortunately, Baroness Symons could not be with us today. Therefore, the findings of the President of the Conference will be presented by R. Wright, UK Governor on the IAEA Board of Governors. The findings were developed with the assistance of the Programme Committee and session rapporteurs.

A. DJALOEIS: I would like to have included in the recommendations that security awareness, security practices and security culture should be promoted in the nations concerned.

T. TANIGUCHI: If you check the draft, you will see that the awareness issue is included, but your comment will certainly be included in the proceedings.

R.F. CAMERON: There would be value in adding the comment from this morning's session that we would encourage the IAEA to develop a systematic approach based on a series of milestones or best practices to assist Member States in implementing a nuclear security programme. This would address a number of comments and requests from Member States.

L. KEEN: I suggest including words around the promotion of security culture to set it in the broader context of the present safety culture.

T. TANIGUCHI: I would like to add a few comments on behalf of the Secretariat. The purpose of this conference was to discuss where we are, where we go in the coming years and how we do it. Now we have a much clearer picture, thanks to the insightful presentations and comments in the seven sessions. I myself learned a lot, and the findings of the President of the Conference and the supporting material presented by the speakers will form a solid basis for preparing the IAEA's next Nuclear Security Plan, to be considered for approval by the Board of Governors later this year. For this, I'd like to express appreciation to the President of the Conference, the session chairs and all the speakers and participants.

The main message of the conference for the IAEA — particularly from this morning's session — is to develop a systematic approach and strengthen the IAEA's nuclear security related functions, continuing to support international, regional and bilateral coordination and cooperation. Regarding the strengthening of the nuclear security function in the IAEA, I am now planning, together with the development of the new Nuclear Security Plan, to upgrade the Office of Nuclear Security by creating three sections corresponding to the main pillars of this area: (1) strategic planning and coordination, including the enhancement of the global nuclear security framework; (2) prevention measures, in particular physical protection; and (3) detection and response, including border measures and illicit trafficking.

With regard to response — as Ms. Nilsson explained this morning — our department has recently established an Incident and Emergency Centre to cover not only safety emergencies but also security related events from the early stages of a request for assistance. This centre is now directly under my responsibility, promoting cooperation and coordination between the three offices/divisions involved, for easy access and more effective service and response.

To strengthen security functions and develop a long term systematic approach, we need your strong support, including the predictability and stability of financial and other resources.

Before closing, I am pleased to report that at this conference there were 288 participants from 68 countries and 12 organizations. I would like to thank the cooperating organizations, namely the EU, the OSCE, the WCO, Interpol and Europol. Also, I convey our gratitude to the UK Government for its generosity in hosting this conference.

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The principal aim of the International Conference on Nuclear Security: Global Directions for the Future was to share information on how to most successfully combat sub-State and criminal threats now and in the future and to foster a better understanding and awareness of the global changes since 11 September 2001. The conference considered the threat of malicious acts involving nuclear and other radioactive material, the experiences, achievements and shortcomings of national and international efforts to strengthen the prevention of, detection of and response to malicious acts involving these materials, and the ways and means to achieve future improvements. These proceedings contain the opening and keynote addresses and the invited papers presented during the various topical and panel sessions. The conference generated an extensive exchange of information on key issues related to a number of aspects of nuclear security. The summaries of these discussions as well as the findings, as presented by the President of the Conference, are also included.

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