As delivered

The Control of Nuclear Proliferation:
Future Challenges

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Since its first discovery, nuclear energy has always drawn two reactions: hope, that the safe and peaceful development and application of this unique form of energy will bring a better future for all; and apprehension, that its abuse or misuse would have the opposite effect. The post-cold war period has brought new opportunities, new commitments and new tools for reducing apprehension about the use of weapons of mass destruction - and, more specifically for the IAEA, it has brought with it a basis for working towards the elimination of nuclear weapons. But there are also major challenges and many questions as to how to implement the new commitments and expand the opportunities.

New opportunities

In 1963, at the height of the cold war, President Kennedy predicted that there would be over 20 nuclear-weapon States by the end of the century. Clearly, this has not happened. Instead, the NPT has been extended indefinitely and is now adhered to by some 180 countries, the Comprehensive Test Ban Treaty (CTBT) has been opened for signature and, in the area of export controls, multilateral regimes including the Nuclear Suppliers Group and the Missile Technology Regime have evolved, adding new members and with refined rules.

These global measures are reinforced by a range of regional arrangements. The Tlatelolco Treaty is now in force for almost all States of Latin America and the Caribbean region - the notable gap being Cuba. Also Nuclear Weapon Free Zones have been established in the South Pacific, South East Asia and, following South Africa's decision to dismantle its nuclear weapon programme, in Africa. Russia remains the only State of the former USSR to retain

nuclear weapons. In addition, reinforcing the norm of non-proliferation, the US and Russia have begun to dismantle nuclear weapons and strategic missiles and further reductions are expected under the pending START II treaty and an anticipated START III accord.

Challenges

But not all the news has been good and the international community has had to face new challenges. Developments in Iraq revealed the inadequacies of the current system of verification. The phenomenon of illicit trafficking in nuclear materials and the possibility of nuclear terrorism challenged the adequacy of physical protection and control standards and mechanisms, as well as posing health and safety threats. Despite glimpses of hope, some regional areas of high tension, such as in the Middle East and South Asia, remain of deep concern.

Two points emerge clearly from this pattern of new opportunities and new challenges. First, that political will must be accompanied by effective tools: technical modalities, legal frameworks and adequate resources. Second, by corollary, that the "tools" will not be effective unless the political will and commitment to use them is there.

The IAEA

Against this background, my focus this afternoon is on verification and non-proliferation from the perspective of the role being played by the International Atomic Energy Agency (IAEA). The IAEA was created 41 years ago with a mandate to co-ordinate international co-operation for the regulation and use of a technology that cuts across many sectors. Its twin objectives are to seek to enlarge the contribution of atomic energy to peace and development and to ensure, so far as it is able, that atomic energy is used within a sound framework, i.e. peacefully and safely. This second objective has two major tasks: to assure, through its verification system, that pledges to use nuclear energy exclusively for peaceful purposes are fulfilled; and, equally, to strive for the highest level of safety in all areas of the use of nuclear energy. In fulfilling its objectives the Agency's role is to be an objective and scientifically credible institution that serves as a centre for analytical work, expert advice, standard setting and oversight and verification. And it is from this vantage point that I would like to address you today.

Current Verification Activities

Realization of the opportunities for arms control and reduction provided by the end of the cold war depends critically on effective systems of verification and safeguards. As we move to fewer nuclear weapons the effectiveness of verification - the degree of assurance that there is no cheating - becomes even more important. In 1997, the Agency was applying safeguards in almost 70 countries at over 900 facilities - and involving more than 10,000 days of inspection. While the vast majority of these activities proceeded without hindrance or unusual difficulty, two special cases are of note.

Iraq

In the case of Iraq, in 1991 the Agency was mandated under Security Council resolution 687(1991) to carry out on-site inspections of Iraq's clandestine nuclear weapons programme and destroy, remove or render harmless the components of that programme. Most of the IAEA activities involving the destruction, removal and rendering harmless of the components of Iraq's nuclear weapons programme were completed by the end of 1992. Since that time, only a relatively small number of items of proscribed equipment and materials have been identified and disposed of. While no indications of the presence of further proscribed equipment or materials in Iraq have been found, the IAEA cannot provide absolute assurance of the absence of readily concealable items, such as components of centrifuge machines or copies of weapons-related documentation.

The IAEA's activities regarding the investigation of Iraq's clandestine nuclear programme have reached a point of diminishing returns and the Agency is focusing most of its resources on the implementation and technical strengthening of its plan for the ongoing monitoring and verification (OMV) of Iraq's compliance with its obligations under the Security Council resolutions. Taking into account the extensive technological expertise developed by Iraq in the course of its clandestine nuclear programme, the OMV plan is predicated on the assumption that Iraq retains the capability to exploit, for nuclear weapons purposes, any relevant materials or technology to which it may gain access in the future.

The IAEA is not "closing the file" on its investigation of Iraq's clandestine nuclear programme and will continue to exercise its right to investigate any aspect of that programme, to warrant such further investigation.

Democratic People's Republic of Korea (DPRK)

By contrast with Iraq, where the limitations of the safeguards system were exploited, in the DPRK, IAEA scientific analysis of declared material led to the inference that undeclared reprocessing had taken place and that the DPRK must possess more plutonium than it had declared. Under the "Agreed Framework" negotiated bilaterally with the United States, the DPRK accepted *inter alia* IAEA monitoring of a freeze of its graphite moderated reactors and related facilities and committed itself to declaring its inventory of plutonium (an obligation it had already under its Safeguards Agreement with the IAEA).

Since 1994, the IAEA has maintained a continuous presence of inspectors for the purpose of monitoring this "freeze". The situation has remained stable and we have been able to confirm that the "freeze" continues. However, in nine rounds of technical discussions, there has been no progress on long-standing and important issues, including agreed measures for the preservation of information which must remain available to enable the Agency to verify, in the future, the correctness and completeness of the DPRK's initial declaration and future compliance with its safeguards agreement. At the moment, the DPRK is not in compliance with the Safeguards Agreement which the IAEA Board of Governors and the UN Security Council consider to be valid and in force.

The Strengthened Safeguards System

The experience in each of these areas led the international community to show the political will to develop a qualitatively more effective IAEA verification system. Some measures were introduced within existing IAEA authority but some key elements of the new system required additional legal authority. In May last year, the IAEA Board of Governors approved the Model Additional Protocol which provides the legal framework for that additional legal authority. On the basis of this model, individual States are invited to conclude a Protocol additional to their existing safeguards agreement.

To fully understand the new Strengthened Safeguards System, it is important to recall that for much of its existence the full potential of the IAEA as the global instrument for nuclear verification was limited by a safeguards system that focused primarily on nuclear activities declared by the State. The system failure in Iraq - primarily due to lack of information - and the situation in DPRK made it clear that an effective verification system must cover not only declared activities but also possible undeclared activities.

To do this, the system needed to move beyond its original focus on nuclear material accountancy - a system designed to keep track of material declared to inspectors. Information provided under this system is limited to nuclear material and the facilities in which it is used. Access to these nuclear facilities is circumscribed. And the IAEA inspection was not focused on the completeness of the information provided but only its correctness, i.e. whether the nuclear material reported by the State is accounted for, but not whether the State has nuclear material that it did not declare.

The newly strengthened safeguards system, by contrast, is based on different principles. First, the system must be effective in dealing with both declared and possible undeclared activities. It must provide as complete a picture as possible of the state of nuclear activities and not limit itself to the confines of nuclear material. And it must allow the Agency an adequate right of access. The system must also be cost efficient - both to Governments and to nuclear operators.

Strengthening the effectiveness of the safeguards system has three components: more information, more access and greater use of appropriate technology. The new system provides for a qualitative and quantitative improvement in information, a key to any effective verification system. In addition to information on nuclear material, States are required to provide detailed information on all other nuclear and nuclear-related activities as well as information on all export and import of nuclear related items. The Agency has substantially strengthened its analytic capacities, including through a computerized system for storage and retrieval of information and through the development of a computer model for the analysis of all known processes for the production of weapons-usable material. The bottom line with respect to information is that the Agency now has a better vantage point from which to develop a comprehensive picture of all nuclear activities in a State and to detect any inconsistency or anomaly in that picture.

The new system provides for substantially broader access for inspectors. The essence of the new system is: trust, but verify. Inspectors are no longer limited to specific "strategic points" - they may inspect any place on a nuclear site and other locations where nuclear material is present. The State is also required to provide access to all locations that are, or could be, engaged in nuclear fuel cycle related activities and, if this is not possible, to make every reasonable effort to satisfy Agency requirements without delay through other means. Of particular importance are the new modalities for greater use of unannounced, or "no-notice", inspections. States are obliged to issue to inspectors multiple entry visas valid for at least one year and to permit and protect Agency communications, including the use of satellite systems.

The third aspect of effectiveness concerns the better use of technology. The Agency has the right to collect environmental samples anywhere it has a right of access. Results to date have demonstrated that these techniques are powerful tools for detecting undeclared activities and that sampling provides unambiguous information about the full range of past and current nuclear activities at the specific site. The Agency is also preparing for extensive use of remote monitoring technology transmitting to IAEA headquarters in near-real time images and results appropriately authenticated and encrypted.

All these new measures have been thoroughly tested - extensive trials were conducted for example in Sweden where it was possible to check the results in the context of a long and highly developed nuclear fuel cycle programme. I take this opportunity to record the Agency's gratitude to Sweden's long standing support for IAEA safeguards - and specifically its work in these trials - and its support to the countries of the NIS in introducing nuclear control systems.

The new measures have involved a substantial immediate resource investment in training, equipment procurement, improving information gathering and analytic capacity. However, the goal is that the new system will eventually be cost neutral in terms of the Agency effort. On the other hand, States which subscribe to the Additional Protocol should be able to better demonstrate the peaceful nature of their nuclear activities and benefit from a reduction in the volume of routine activities carried out by the Agency.

Savings are likely to come from four areas: the introduction of the new technology may enable reduction in on-site inspection; successful meshing of the old and new measures may

provide sufficient assurance to be able to reduce some traditional measures such as interim inspection on spent fuel; increased and improved co-operative arrangements with national and regional systems, such as the new partnership approach with Euratom, could enable the establishment of a prudent division of labour while respecting the individual mandate of each verification organization and the Agency's responsibility to maintain its own independent conclusions ; and administrative savings from the implementation of streamlined measures, including multiple entry visas, simplified designation of inspectors and facilitation of Agency communications.

The priority now is to sustain and build on the present momentum towards the conclusion of Additional Protocols. The sooner these procedures are completed, the sooner we will accumulate the practical experience necessary to be able to adjust and better focus our activities to achieve greater efficiency and greater effectiveness of the safeguards assurance. Seven States have now signed, and there has been encouraging progress in recent consultations with key countries and groups, including members of the European Union, Japan, Canada, as well as the United States. The conclusion of all Additional Protocols by the end of the year 2000 is not an unrealistic goal.

This more finely meshed system being introduced can raise substantially the level of assurance, but it must be recognized that even with full implementation the new safeguards system, in and by itself, cannot provide 100 percent assurance. The nature of the verification assurance is a "negative" assurance based on the propositions that we have not observed any diversion and that in the absence of any such observation we have no reason to reject the claim by the relevant State that no diversion has taken place. Some uncertainty is inevitable in any country-wide technical verification system that aims to prove the negative, i.e. prove the absence of concealable objects or activities. Even with all the authority provided by the Security Council to the IAEA in Iraq, a degree of uncertainty will also remain there.

The extent to which such uncertainty is acceptable is a policy judgement. It should, however, be noted that the assurance derived from Agency safeguards is supplemented and reinforced by other parts of the non-proliferation regime, including export/import control, the Security Council, as well as regional and global security arrangements. And while these parts of the regime have also been evolving progressively, there are still gaps and shortcomings in some

of them which we need to continue working to close - for example, reaching consensus on supply conditions and regional accommodations in the Middle East.

The Future

Thus far I have dealt with the development of the new safeguards system and its specific objective of halting the spread of nuclear weapons. However, it is clear that progress on further non-proliferation or arms reduction agreements will need to be underpinned by effective operational and technical modalities of the kind now being introduced by the Agency. Let me now turn to some additional verification challenges that have been engaging the Agency's attention.

Trilateral Initiative

Under the Trilateral Initiative between Russia, the United States and the IAEA, the three parties are examining the technical, legal and financial arrangements for the Agency to verify that fissile materials removed from dismantled nuclear weapons are not returned to weapons use, and that other fissile materials declared surplus to defence programmes are not diverted. This undertaking would be the first specific mission for the IAEA in the international verification of steps towards nuclear disarmament, in relation to the obligations of Article VI of the NPT. President Yeltsin has stated that 40 percent of Russia's stock of plutonium removed from weapons will be stored under IAEA verification in the Mayak facility, which is presently under construction.

Technical meetings with the parties are continuing as the Agency seeks to find answers to a number of complex questions. One challenge is to respect the "proliferation sensitivity" of some of the materials to be verified (their shape, composition, masses, isotopic composition and alloying ingredients). The problem is to be able to make measurements which will provide credible assurance, but without discovering or revealing classified information. A second challenge is to develop an appropriate legal framework which can also be adopted by other nuclear-weapon States. Finally, it will be necessary to establish an appropriate funding mechanism to provide the significant Agency resources this verification will require. A nuclear arms control fund which covers these and other nuclear arms control activities is an option worth pursuing.

Preliminary steps are allowing the IAEA to gain experience in relation to the verification of unclassified surplus defence fissile materials in the United States. To date, 12 tonnes of excess highly enriched uranium (HEU) and plutonium have been placed under IAEA inspection under the Voluntary Offer Safeguards Agreement, and in December last year the US committed itself to putting 52 additional tons of fissile material under safeguards, with the expectation that all such fissile materials would be transferred to verification under the new agreement when it takes effect.

Nuclear Terrorism

An area of legitimate concern is the possibility of the theft and trafficking of nuclear materials and acts of nuclear terrorism. While there are no known cases where weapons or components have been stolen, there have been cases of theft of plutonium or HEU, mostly from facilities in the former Soviet Union. The prevention of such theft is a State responsibility but regional and international co-operation is essential. The IAEA is assisting some 53 Member States to strengthen and improve their national regulatory infrastructures, thereby upgrading their systems for the physical protection, accounting and control of these materials.

There is also a need to periodically review and upgrade the recommended physical protection standards and their implementing legal instruments. A review of IAEA recommended physical protection guidelines is currently in progress. It may also be appropriate to revisit the Convention on the Physical Protection of Nuclear Material to ensure its coverage of all nuclear material in international as well as in domestic storage, use or transport. The Agency has been actively supporting the work of the Ad Hoc Committee established by the United Nations to elaborate an international convention for the suppression of acts of nuclear terrorism to supplement related international instruments, with a view to ensuring synergy, not duplication, with the Physical Protection Convention. We welcome this effort to strengthen the international regime for preventing the illicit trafficking of nuclear materials as well as radioactive sources.

Fissile material cut-off Treaty

By contrast, I must express regret that negotiations on a treaty prohibiting the production of HEU or plutonium for weapons purposes have not yet begun. Such a treaty would be an important step towards the goal of elimination of nuclear weapons, and such a treaty would complement and further strengthen the non-proliferation regime. Under a cut-off treaty there would be assurance that the global aggregate of weapons-usable fissile material, being reduced through a number of measures, is not expanding through new production. It is to be hoped that preparations for the NPT Review Conference in the year 2000 will bring new impetus to this issue and lead to the commencement of negotiation and early conclusion of a cut-off treaty in accordance with the commitments made at the 1995 NPT Review Conference. In the meantime, I urge that time not be lost in progressing with work on the research and development on the new verification concepts and techniques which will be required for such new verification roles.

Outlook

The end of the cold war has brought profound changes. For the first time, the international community can justifiably place hope equally on non-proliferation and on the prospects for nuclear disarmament, recognizing that the legacies of the past fifty years will not disappear overnight. The new strengthened safeguards system is a quantum improvement in the tools and modalities for increasing the level of non-proliferation assurance. But equally, if not more important, is the political commitment that has been demonstrated. In supporting an "intelligent" verification system - one where qualitative assessment is now taking its place alongside number crunching - the international community has demonstrated unprecedented confidence in multilateral verification mechanisms.

While the objectives of the nuclear control agenda remain largely the same: to reduce nuclear arsenals, to maintain non-proliferation and to keep effective national control of nuclear material, new tools which could provide the required level of assurance will need to be developed. From the perspective of the IAEA, the challenge is to meet the assurance objectives of our Member States as they make the political decisions to reduce, and hopefully eliminate, nuclear weapons. In an international environment where key States are manifesting

political will to move down this path, the effectiveness of verification has become even more important. The unique role of the IAEA, and its expertise and objectivity, are resources which States should draw on fully.

But, as I mentioned before, verification and safeguards cannot do the job alone. Effective international verification can provide an important assurance but just as important is that verification should continue to be supported by other parts of the non-proliferation regime, including export/import control, a dynamic Security Council to ensure enforcement, as well as regional arrangements and accommodations, such as Nuclear Weapon Free Zones, that build and enhance confidence and reinforce the development of disincentives to acquire nuclear weapons.

In summary, the future challenge of controlling nuclear proliferation is both a political and technical challenge. It is the Governments which have to take the necessary political initiatives for such measures as Nuclear Weapon Free Zones and effective nuclear arms reduction agreements. But these political initiatives will be greatly facilitated by enhanced confidence in the effectiveness of verification. I do hope that the IAEA will be able to contribute to the creation of that confidence and look forward to the continuing very active support and contributions from Sweden - and, indeed, as broad a range of countries as possible - in that regard.