This viewpoint assesses the present state of affairs on a number of nonproliferation subjects, using the analogy of a student who is being graded. The goal is both to recognize the progress the world has made, and to set out the specific areas where further effort is most needed. This viewpoint also indicates what role the International Atomic Energy Agency (IAEA) can play in advancing the nonproliferation process.

Examining the current state of affairs in the international security field, and particularly in the realm of nuclear nonproliferation, is no easy task. The past decade, the post-Cold War decade, may go down in history as unparalleled in terms of the momentous changes that have taken place in the international political landscape. What has made these changes unique has been their largely peaceful nature. To have evolved from a long period of ideological struggle and confrontation between East and West to a more liberal, pluralistic, and cooperative world order in so short a time, without major conflict, is indeed without precedent in modern times. Although the world still faces difficult challenges, including the resurgence of ethnic conflict and a number of chronic regional disputes, we can now address these problems with much less fear that they might lead to a global nuclear war.

The demise of the Cold War presented the world with unique opportunities and challenges. As the last decade of this century draws to a close, we need to look back on the accomplishments, challenges met, and opportunities missed or not yet fully exploited in this new global environment. We must also look forward through the fog of the future to identify as best we can what further work needs to be undertaken, and what potential obstacles lie ahead. While the report card on the international community’s past performance in this decade will reveal that the student has superior talents and potential, it will also show that these talents have not yet been fully exploited, or that the potential has not yet been fully developed. This is perhaps because the student has not worked hard enough.

The rivalry between East and West that marked the Cold War is over. The unconstrained buildup of nuclear weapons associated with that rivalry has largely ended. The nuclear arms race between the superpowers has been halted, and Russia and the United States have transformed their vertical proliferation into vertical disarmament. The chance of devastating, total nuclear war has been significantly reduced. In most regions of the world, there is a growing realization that security interests can best be met through a combination of political, economic, and social policies that reduce the incentive to acquire nuclear weapons as the ultimate solution to international disputes. Possession of nuclear weapons is no guarantee of national security or international respect, and nuclear deterrence as a credible vehicle for the management of relations between nations is coming under increasingly critical scrutiny. The Treaty on the Non-Proliferation of Nuclear Weapons (NPT) is the most widely adhered-to international arms control treaty in history. Earlier this decade, the ominous minute hand of the Doomsday Clock of the Bulletin of the Atomic Scientists had been progressively turned farther back than at any time during its history. The accomplishments of the international community in forcing the nuclear genie back into the bottle during the past few years have not been insignificant.

Nevertheless, there have also been frustrations. The five de jure nuclear weapon states (NWS) still possess frighteningly high numbers of nuclear weapons. Multi-lateral negotiations among the NWS to further reduce nuclear arsenals remain elusive despite vociferous demands by the non-nuclear weapon states (NNWS) for

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Further advances in arms control and nonproliferation, and for a more direct role in the nuclear disarmament process. The actions of two non-nuclear weapon states party to the NPT have led to a questioning of their commitment to the Treaty. One (Iraq) was discovered to have operated clandestine nuclear programs in defiance of its NPT obligations. The other (North Korea) continues to resist the IAEA’s efforts to verify its compliance with its safeguards agreement pursuant to the NPT. Illicit trafficking in nuclear materials also remains a dangerous threat. Ominous as well has been the open attempt of two other nations (India and Pakistan) to join the club of nuclear weapon states. Despite evidence worldwide that the acceptance of nuclear weapons as useful tools for the pursuit and achievement of national objectives is diminishing, some still seem to see them as a status symbol and bargaining chip, regardless of the obvious dangers and political disadvantages associated with their possession. A few months ago, the hands of the Doomsday Clock were unfortunately but understandably moved up to nine minutes to midnight as a consequence of these developments.

So where do we stand today? What does the report card show? What remedial work remains to be undertaken? And what is the role of the IAEA in this environment?

**THE REPORT CARD**

As we move towards the year 2000 and the sixth Review Conference of the Non-Proliferation Treaty, the most widely accepted yardstick for measuring the world’s nuclear nonproliferation performance is perhaps the Declaration of Principles and Objectives for Nuclear Non-Proliferation and Disarmament, to which the participants at the fifth Review and Extension Conference in 1995 dedicated themselves. This Declaration sought to exploit and build upon the end of the Cold War and the ensuing easing of international tension. It sought to establish a set of principles and objectives in accordance with which achievements and shortcomings in the spheres of nuclear nonproliferation, disarmament, and international cooperation in the peaceful uses of nuclear energy could be measured periodically, with appropriate action to be taken by the international community. The Declaration was an ambitious checklist of items, which nations at the time thought were necessary, positive, and “do-able.” Let me briefly review this yardstick for success and compare it with developments since 1995.

At the 1995 Review and Extension Conference, participating states saw universal adherence to the NPT as an urgent priority. For 30 years, global nuclear nonproliferation efforts have been built upon the foundation provided by the Non-Proliferation Treaty. Under this agreement, most of the world’s non-nuclear weapon states have committed themselves not to acquire such weapons; the nuclear weapon states have committed themselves, *inter alia*, to negotiations on nuclear and general disarmament; and all parties have pledged to facilitate, to the fullest extent possible, the exchange of equipment and materials and the transfer of science and technology for peaceful uses of nuclear energy. In the 1995 Declaration of Principles and Objectives, all states were urged to accede to the NPT, particularly those with unsafeguarded nuclear facilities. States responded to this call. The number of NPT signatories has climbed from 178 in 1995 to 188 today. A handful of states, however, including a number with significant nuclear programs and unsafeguarded facilities, still remain outside the Treaty. Some of them continue to regard the NPT as discriminatory, and say that the nuclear weapon states have not fulfilled their commitments to nuclear disarmament under Article VI of the Treaty. They seem still to believe that nuclear weapons guarantee national security and international prestige, which is counter to the predominant view. In the short term, there seems to be no solution to this standoff. At best, then, the world merits a barely passing grade on making adherence universal.

In 1995, states agreed that the undertakings with regard to nuclear disarmament as set out in Article VI of the NPT should be fulfilled. In particular, the Review and Extension Conference gave priority to the achievement of a comprehensive test ban treaty (CTBT) not later than 1996, the immediate commencement of negotiations on a convention banning the production of fissionable material for nuclear explosive purposes, and systematic and progressive efforts by the nuclear weapon states to reduce nuclear arsenals.

After more than three decades of intermittent negotiations, the long-awaited goal of a universal and verifiable comprehensive test ban treaty became a reality in 1996. The CTBT was one of the longest-sought, hardest-fought-for arms control treaties in history. An end to nuclear weapons testing is a critical component in efforts to prevent further horizontal and vertical nuclear proliferation. In just two years, the CTBT has acquired
more than 150 signatories. Even more significant are the indications by the prime ministers of India and Pakistan, since the fall 1998 UN General Assembly, that their countries are now prepared to adhere to the CTBT. This brings the Treaty ever closer to entry into force. Here, our student passes with flying colors.

In addition to a complete ban on nuclear testing, freezing the production of fissile materials for nuclear explosive purposes has long been identified as indispensable to nuclear arms reduction and elimination. United Nations General Assembly Resolution 48/75, adopted by consensus in December 1993, called for the negotiation of a non-discriminatory, multilateral, and internationally and effectively verifiable treaty to this end. Subsequently, the Conference on Disarmament (CD) reached agreement on a mandate for such negotiations in March 1995. That is where the matter stood at the time of the Extension Conference and where it rested for the next three years. A breakthrough was finally achieved in August 1998, when the CD agreed to the creation of an ad hoc committee to begin negotiations. This is a significant development. It means that after many years, all member states of the CD—NPT signatories and non-NPT signatories, NWS and NNWS—acknowledge that the time has come to negotiate such a ban. Some of the nuclear weapon states have already announced that they no longer produce nuclear material for their weapon programs. Here, our student has made positive progress; however, we must wait to see the results of the next semester, the spring semester, before we can assign a grade.

The nuclear weapon states reaffirmed in 1995 their commitment to pursue in good faith effective measures relating to nuclear disarmament. The United States and Russia have made progress in reducing their nuclear arsenals. Over the past decade, these two countries have together deactivated or eliminated more than 18,000 nuclear warheads. At the March 1997 Helsinki Summit, Presidents Clinton and Yeltsin also agreed on the next step in strategic nuclear arms reductions, which will reduce their arsenals to 20 percent of their Cold War peaks. Additionally, both countries have agreed to release up to 100 tons of weapons-grade plutonium from their defense programs, and both have indicated their intention to blend down hundreds of tons of highly enriched uranium for use in civilian power reactors. Although not engaged in formal negotiations on the reduction of nuclear weapons, the United Kingdom and France have also unilaterally eliminated entire classes of nuclear weapons and have significantly revised planned nuclear modernization programs. All nuclear weapons have been removed from Ukraine, Belarus, and Kazakhstan, which have now all concluded comprehensive safeguards agreements with the IAEA. South Africa abandoned its nuclear weapons program and eliminated its arsenal in the recognition that the political and security considerations that had led to their acquisition no longer pertained, and that adherence to global nuclear nonproliferation norms would instead enhance the country’s security.

But does the international community see these efforts as signs of sufficient progress? Do these efforts respond adequately to the universally expressed desire for general and complete nuclear disarmament? Tens of thousands of nuclear weapons remain deployed around the world. The START II agreement remains unratified. Nuclear weapons still play an important role in some national strategies. Multilateral nuclear disarmament negotiations remain an elusive quest. Moreover, a few more states have applied for membership in the nuclear club, making any multilateral efforts to eliminate, reduce, or even freeze the numbers of nuclear weapons even more complex. Most serious of all, the NPT process may still find itself in rough waters, if the results of the last two preparatory conferences are any indication. Here, our student continues to under-perform and merits, unfortunately, a failing grade.

The participants at the 1995 NPT Extension Conference confirmed their conviction that the establishment of internationally recognized nuclear-weapon-free zones, on the basis of arrangements freely arrived at among the states of the regions concerned, enhances global and regional peace and security. In 1995, only three nuclear-weapon-free zones existed, in Latin America and the Caribbean, the South Pacific, and Antarctica. Since then, the Treaties of Bangkok and Pelindaba have resulted in two more zones, in Southeast Asia and Africa. The Treaty of Bangkok has already entered into force. These nuclear-weapon-free zones now cover more than 100 countries and most of the southern hemisphere. Moreover, in all cases, the NWS have committed themselves, through their accession to the protocols to these treaties, to provide legally binding assurances to honor the terms of these agreements. Negotiations are also at an advanced stage in Central Asia to conclude a similar treaty among the states of this region. The most recent meeting of Central Asian experts in Geneva resulted in significant progress on the text of a treaty. The IAEA
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has indicated to the parties that it is prepared to host one of the next meetings in an effort to bring the negotiations to an early and successful conclusion. Against this generally positive backdrop is juxtaposed the lack of progress in development of nuclear-weapon-free zones in regions of tensions, such as the Middle East and South Asia, where such agreements could make a significant contribution to greater regional security. On the whole, however, it would be remiss not to award an “A” for effort to all those involved in the expansion and consolidation of nuclear-weapon-free zones around the world.

THE ROLE OF THE IAEA

In the 1995 Declaration of Principles and Objectives, states recognized the International Atomic Energy Agency as the competent authority to verify and assure, in accordance with the Statute of the IAEA and the Agency’s safeguards system, compliance with its safeguards agreements with states. They noted that nothing should be done to undermine the authority of the IAEA in this regard.

States party to the NPT rely on Agency safeguards for assurance of compliance by other states with their nonproliferation undertakings, as well as to demonstrate their own compliance. Provision of such assurance promotes further confidence amongst states and, as a fundamental element of the NPT, IAEA safeguards help to strengthen collective security. During the past 30 years, the Agency has been able to provide a high level of assurance of the non-diversion of nuclear material that has been placed under safeguards, and to identify cases where safeguards obligations are not being met. Effective safeguards have been maintained, particularly with regard to weapons usable nuclear material—separated plutonium and highly enriched uranium.

Nevertheless, not all the news is good. The Democratic People’s Republic of Korea (DPRK) remains in noncompliance with its comprehensive safeguards agreement, and concerns still exist about the DPRK’s declaration of its nuclear material subject to safeguards. In the case of Iraq, even though (after more than seven years of the most extensive and intrusive inspection regime in history) we believe we have a rather clear, technically coherent picture of Iraq’s nuclear program, questions and uncertainties remain concerning its past clandestine nuclear weapons program and its current intentions and activities. Recent events in Iraq certainly give continued cause for concern. Although the crisis in November 1998 was defused, the next one was not. The result is that, along with UNSCOM, the IAEA has had to pull out its inspectors and, for the time being, all monitoring has stopped.

The IAEA is also encountering increasingly severe resource constraints resulting from successive zero-real-growth budgets for the Agency stretching back into the last decade. These constraints have occurred at a time of significant real growth in the Agency’s workload.

I referred earlier to the increase in the number of states party to the NPT since 1995. Unfortunately, this has not been accompanied by an equally strong commitment by NPT signatories to conclude comprehensive safeguards agreements with the IAEA. The Treaty embodies the legal requirement that such safeguards agreements should be concluded and enter into force no later than 18 months after a country’s accession to the NPT. While 19 new safeguards agreements have come into force since the 1995 NPT Review Conference, more than 40 NPT signatories have yet to conclude safeguards agreements. States should sign and bring into force comprehensive safeguards agreements pursuant to their commitments under the NPT without delay.

In 1995, states supported the further strengthening of the Agency’s safeguards system. Here, I can report notable successes. Throughout the 1990s, extensive efforts have been directed at strengthening the effectiveness and improving the efficiency of the safeguards system, building upon the events in Iraq and the DPRK and experience gained elsewhere, such as South Africa. Improvements in safeguards are continuous, in any case. Early improvements to safeguards measures and procedures in the post-Iraq period include a reaffirmation of special inspection rights, early provision of design information, and a voluntary reporting scheme by which the leading nuclear exporters agreed to provide the IAEA with information on their exports of nuclear material, specialized nuclear equipment, and non-nuclear material. The major effort, however, was launched in 1993, two years before the NPT Extension Conference. The program, thus named “Programme 93+2,” aims at strengthening the effectiveness and improving the efficiency of safeguards.

The term “effectiveness” reflects the extent to which IAEA verification achieves nonproliferation objectives. “Efficiency” reflects the productivity of IAEA safeguards—that is, how well available resources are used.
to fulfill the stated objectives. The main strategic objectives of the Agency in its pursuit of the goals of effectiveness and efficiency have been:

(a) reducing the cost of implementing safeguards while maintaining or improving safeguards effectiveness;
(b) increasing the assurance of non-diversion provided by safeguards; and
(c) improving the capabilities of the Agency to detect undeclared nuclear activities.

Of these, the last objective has certainly been the main focus of the Programme 93+2.

Modalities for achieving the objectives include:

(a) increasing the effectiveness and/or the efficiency of safeguards through greater cooperation with State Systems of Accounting and Control (SSAC);
(b) improving the effectiveness and/or the efficiency of the acquisition, processing, and analysis of safeguards relevant information; and
(c) improving the capabilities of inspectors, other Agency safeguards staff, and SSAC staff to carry out new measures as required for field testing and implementation.

Work to strengthen the safeguards system has fallen into two types:

(1) implementation of strengthening measures within the Agency’s existing legal authority under current comprehensive safeguards agreements; and
(2) work towards the implementation of the measures for which further legal authority was required, which are enshrined in the Model Additional Protocol adopted by the Board of Governors in May 1997.

While some of the new measures under existing legal authority are of great importance (such as the authority to take environmental samples at certain points in nuclear installations), the major result of Programme 93+2 was the conclusion of the Model Additional Protocol. The Additional Protocol requires states to provide substantially more nuclear and nuclear-fuel-cycle-related information to the Agency, and gives Agency inspectors complementary access rights.

As a result, the IAEA will have more information on states’ nuclear programs than ever before. This information comprises that which is received from states, that gathered by the Agency’s own verification activities, and that collected from other sources. Access to such a wide range of information should allow regular evaluations of the information, review by senior Agency officials, and recommendations for follow-up action. Through this process of information review and evaluation, the IAEA Secretariat should be better able to judge the completeness and correctness of states’ declarations. This will go hand in hand with new action taken covering the handling and maintaining of confidential information by the Agency.

Simplified designation and visa procedures for Agency inspectors are also being pursued with member states to improve physical access rights and thus enable more effective safeguards implementation and more efficient use of Agency resources. Modification and expansion of the training curriculum for inspectors is under way to give inspectors the new skills and abilities required to fully implement all aspects of the newly strengthened safeguards system. New technology, such as environmental sampling and remote-monitoring data-transmission systems, is being introduced in an effort to improve safeguards effectiveness while reducing costs. All of these new measures should produce substantive results.

When the Board adopted the Model Additional Protocol, it requested the Director General to proceed with the conclusion of these Protocols with individual states. The Secretariat of the Agency has, since then, been busily engaged in pursuing the conclusion of Additional Protocols. Where possible, and because Additional Protocols concluded with states with comprehensive safeguards agreements with the IAEA are to contain all measures in the Model Protocol, work has gone forward without any formal consultations between the state concerned and the Secretariat. Where consultations were required, they have taken place in a cooperative and constructive spirit.

As of this writing [January 1999], Additional Protocols for 38 states have been approved by the Board of Governors. They cover 34 non-nuclear weapon states and four nuclear weapon states. All but three of these Additional Protocols have been signed. Five of the Protocols are already in force, and two more are being applied provisionally pending their entry into force. One more will be applied provisionally upon entry into force of that state’s safeguards agreement. These Protocols already cover a significant majority of the world’s civilian nuclear activities. Consultations are also proceeding with a number of other states. The Secretariat is actively encouraging states to conclude Additional Protocols as a contribution to global nonproliferation objectives. The
Director General has made the conclusion of such Additional Protocols with all states by the year 2000 a priority for the Agency.

At the same time, work is continuing within the Secretariat to develop a new infrastructure in order to implement the Additional Protocol. Areas covered include:

- the development of guidelines for states’ submissions pursuant to Articles 2 and 3 of the Protocol;
- the development of model language for Subsidiary Arrangements;
- the development of internal guidelines for complementary access;
- the development of procedures and systems for information treatment; and
- the development of operational procedures for Protocol implementation on a state-by-state basis.

The long-term aim of the IAEA is to mesh the traditional, nuclear-material-accountancy-based safeguards system with the new strengthening measures, taking the view that only then can the Agency’s safeguards objectives be met with the optimum effectiveness and efficiency. High priority is being given to this work on integration.

The Agency’s role in contributing to the nonproliferation of nuclear weapons has been clearly defined and widely accepted for decades. Yet there are new verification challenges associated with nuclear disarmament initiatives that have, or could have, implications for the IAEA. For example, over the past two years, the Agency has been involved in discussions with the Russian Federation and the United States regarding the possible verification of nuclear material transferred by Russia and the USA from their military programs, notably fissile material from dismantled nuclear weapons, to the civilian sector. Further, the United Kingdom has recently announced that, following its Strategic Defence Review, substantial amounts of fissile material surplus to the needs of its defense program will be made available for IAEA safeguards. Additionally, the Agency could become involved in the verification of a future treaty prohibiting the production of fissile material for nuclear explosive purposes, and is currently studying possible verification options that the negotiators in Geneva may propose. The future verification of other nuclear materials of potential proliferation significance requires study. In all of these cases, the Agency is prepared to contribute its verification and safeguards expertise and experience to the full realization of these initiatives.

**PEACEFUL USE OF NUCLEAR TECHNOLOGIES**

A final word is in order regarding the opposite side of the nuclear coin—the exercise of the inalienable right of all states to pursue research, production, and use of nuclear energy for peaceful purposes without discrimination and in accordance with international norms. While not directly a nonproliferation issue, support for nuclear technology transfer for exclusively peaceful purposes, bearing in mind the special needs of developing countries, is an integral part of the international consensus relating to the peaceful use of nuclear energy that is embodied in the IAEA Statute and the NPT. In this regard, meeting the needs and aspirations of the world’s growing population requires the application of the best available technologies. The role of the IAEA is to ensure, where nuclear technology is the most appropriate technology for addressing a particular problem, that this technology is transferred safely and in the most effective manner.

Some examples of the Agency’s work are worth highlighting. In the area of poverty and food insecurity, the use of biofertilizer technology is yielding remarkable increases in the production of grains and soybeans. The Agency-developed sterile insect technique is being used to eradicate agricultural pests and insect-transmitted disease. The Agency is cooperating in a UN isotope-based study of iron and mineral deficiency in infants. The Agency is supporting 40 national and four regional projects to upgrade radiation therapy services. Environmental isotopes, artificial tracer techniques, and nuclear desalination technology are being used to assess and protect scarce freshwater resources. The Agency is also assisting states in planning and implementing demonstration programs for small and medium nuclear reactor development, as a contribution to global efforts to identify energy sources for sustainable development. Guidance and assistance is also being provided to member states in the area of nuclear and radioactive waste safety, such as the project to assess radioactive conditions resulting from past nuclear activities at the Semipalatinsk test site in Kazakhstan and the Kara Sea.

All of these activities are undertaken within the context of internationally agreed guidelines covering the transfer of nuclear material, equipment, and technology among nations—guidelines that aim to create a stable and predictable framework that enhances rather than restricts such cooperation. I believe that the October 1997...
The seminar in Vienna, organized by the Nuclear Suppliers Group to discuss the “Role of Export Controls in Nuclear Non-Proliferation,” made a positive contribution to a greater understanding of issues in this area.

CONCLUSION

In conclusion, despite the uneven record of performance described above, I am optimistic about the outlook for nuclear nonproliferation and arms control. The Doomsday Clock is too pessimistic. The incentive to acquire nuclear weapons is in large measure linked to how states perceive their security situation. If security is seen as a lessening problem, then any incentive to embrace nuclear weapons should be diminished. If, further, there is a general movement away from nuclear weapons, as appears to be the case, this movement too should reduce the proliferation incentive for other states. As I stated at the outset, in areas where we see the greatest danger of further proliferation, the focus of efforts to impede such a development must be on promoting foreign policies, security policies, economic policies, and social policies that build détente and trust. In addition, however, international verification of arms control and disarmament accords, particularly in the nuclear area, is a vital element. It can act as a confidence-building measure, contributing to the creation of trust and subsequently helping to maintain that trust. It can also sound the warning bell when the basis for such trust is threatened.

The IAEA has a statutory duty to “accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world. It shall ensure, so far as it is able, that assistance provided by it or at its request or under its supervision or control is not used in such a way as to further any military purpose.” In this context, the Agency serves as a vital instrument for the implementation of the NPT and the pursuit of nuclear nonproliferation generally. With adequate resources, and relying upon its newly strengthened safeguards system, the IAEA can effectively verify that nonproliferation pledges are being respected, and thereby continue to make a key contribution in building mutual confidence and enhancing international security. Furthermore, the Agency’s Statute is sufficiently flexible to allow for the application of its verification capacity and experience towards the implementation of nuclear disarmament agreements that are reached in pursuance of Article VI of the NPT. Finally, the Agency can serve as the principal intergovernmental channel for the transfer of peaceful nuclear technology among NPT parties, and for the provision of assistance to developing countries.

Ultimately, however, the actions and activities of the IAEA, an international organization, merely reflect the will of its member states. Only states themselves can decide on the future of the nuclear nonproliferation regime and nuclear arms control and disarmament efforts. Should the international community agree to move forward on those items identified in the Declaration of Principles and Objectives, the Agency stands ready to offer its assistance and support, as required. As we approach the NPT Review Conference at the end of this millennium, hopes for a safer and more secure world rest on advancing the international nuclear arms control agenda towards the reduction and eventual elimination of nuclear weapons. The preservation of an effective verification system is an indispensable element in the realization of this goal.

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1 This viewpoint is an adaptation of Mr. de Klerk’s keynote address delivered to the Monterey Institute of International Studies Conference on “Proliferation Problems and Nonproliferation Initiatives: Approaching the 21st Century,” Almaty, Kazakhstan, November 15-18, 1998. The author thanks Ron Stansfield for his contribution to this article.
2 NPT/CONF.1995/12/DEC.2, reproduced in several periodicals, including the Programme for Promoting Nuclear Non-Proliferation, Newsbrief, No. 30.
3 Published as INFCIRC/540, <http://www.iaea.or.at/worldatom>.
4 Under the Additional Protocol, states may want to agree with the IAEA Secretariat on “Subsidiary Arrangements” that define the verification activities in detail.
5 IAEA Statute, Article II.