

IAEA safeguards and the NPT: Examining interconnections

An overview of the IAEA's verification role and its relationship to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT)

by Jan Priest

In April 1995, the States Party to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) will meet to review the Treaty's operation and decide upon its extension. Quinquennial review conferences have been held ever since the NPT entered into force in 1970, with a view to ensuring that the Treaty's purpose and provisions are being realized.

However, in the light of the NPT's initial 25-year lifespan, the main focus of the 1995 conference will be the Treaty's extension. Article X.2. of the NPT provides that, "Twenty five years after the entry into force of the Treaty, a conference shall be convened to decide whether the Treaty shall continue in force indefinitely, or shall be extended for an additional fixed period or periods. This decision shall be taken by a majority of the Parties to the Treaty."

The IAEA is neither the Secretariat of the NPT nor empowered to request States to adhere to it. It does, however, have formal responsibility in the context of implementing Article III of the Treaty. The IAEA's mandate, expertise, and experience also equip it well to assist in the implementation of other Articles.

At the broadest level, the IAEA provides two service functions under the NPT. It facilitates and provides a channel for endeavours aimed, in accordance with Article IV.2. of the Treaty, at ... "the further development of the applications of nuclear energy for peaceful purposes, especially in the territories of non-nuclear-weapon States Party to the Treaty, with due consideration for the needs of the developing areas of the world."

Its other major function is to administer international nuclear safeguards, in accordance with Article III of the Treaty, to verify fulfillment of the non-proliferation commitment assumed by non-nuclear-weapon States party to the Treaty,

"with a view to preventing diversion of nuclear energy from peaceful uses to nuclear weapons or other nuclear explosive devices."

To put this dual function into historical perspective, it should be remembered that, since Fermi demonstrated the atom's potential in 1942, the basic issue with which humanity has had to grapple is how to exploit nuclear energy for human benefit while concurrently building, maintaining, and developing a shield against nuclear weapons proliferation. The dual nature of nuclear energy, reflected in the NPT, was also earlier very much in the minds of the drafters of the IAEA Statute. Hence, the IAEA was created in 1957 with the twin objectives of promoting the peaceful uses of nuclear energy while ensuring, 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." (IAEA Statute, Article II.)

In the latter connection, Article III.A.5 of the Statute authorizes the IAEA "to establish and administer safeguards" in circumstances when the Agency itself is the source or channel of assistance; when parties to any bilateral or multi-lateral arrangements request it to do so, or at the request of a State to any of that State's activities in the field of atomic energy. Article XII sets out the rights and responsibilities of the IAEA in such situations including the right to examine the design of specialized equipment and facilities, including nuclear reactors to ensure, *inter alia*, that the design will permit effective safeguards application; the right to require the maintenance and production of operating records to assist in ensuring accountability for source and special fissionable material, and the right to send inspectors into the recipient State, with respect to any IAEA project or other arrangement where the Agency is requested by the Parties to apply its safeguards.

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This report examines the IAEA's relationship to Articles of the NPT which are fundamental to the Treaty's non-proliferation, arms control, and disarmament provisions. As such, it looks closely at the role and development of the IAEA's nuclear safeguards and verification system.*

Safeguards and the NPT

If the IAEA Statute provides the basic *authority* for the application of safeguards and provides a framework for such application, legal obligations to invoke safeguards are found elsewhere, i.e. in instruments through which States make a legally binding commitment not to manufacture or acquire nuclear weapons and to accept verification of their compliance with such undertakings. The first such undertaking was made in a regional context through the 1967 Treaty for the Prohibition of Nuclear Weapons in Latin America (The Treaty of Tlatelolco).

However, the entry into force of the NPT in 1970 was a watershed. Firstly, the Treaty was — and remains — the first global nuclear non-proliferation Treaty. Secondly, and stemming from this, the Treaty assigns to the IAEA the responsibility for verifying, at the *global* level, through its safeguards system, that non-nuclear weapon States fulfil their obligations not to use their peaceful nuclear activities to develop any nuclear explosive devices of any kind. In the first years of its existence, the IAEA's technical means of helping to further the non-proliferation objective — its safeguards — applied only to nuclear plants and fuel which countries obtained from abroad, and then only if the supplier insisted on them. For the rest, the country concerned was free either to make its own unsafeguarded plant or fuel and/or to buy them from less demanding suppliers.

The NPT's entry into force marked a new departure in that non-nuclear-weapon States Party to the new, global instrument were — and are — obliged to conclude a "full-scope" or comprehensive safeguards agreement with the IAEA. Under this type of agreement, safeguards are applied to *all* source or special fissionable material in *all* peace-

ful nuclear activities within the territory of the State, under its jurisdiction, or carried out under its control anywhere. NPT safeguards have focused on nuclear material because, from the outset, efforts to combat proliferation were based on the premise that the greatest challenge was the acquisition of weapons-usable material, whether highly enriched uranium or plutonium.

Following the NPT's entry into force, the IAEA Board of Governors established a safeguards committee to advise it on the contents of safeguards agreements to be concluded with non-nuclear weapon States Party to the Treaty. The committee developed a document entitled "The Structure and Content of Agreements Between the Agency and States Required in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons". The IAEA Board of Governors approved this document in 1972, requesting the Director General to use it as a basis for negotiating safeguards agreements under the NPT. The document was published by the IAEA as INFCIRC/153 (Corrected). It has also served as a basis for the structure and content of other comprehensive safeguards agreements. Additionally, while the five nuclear-weapon States Party to the NPT are not obliged to conclude a safeguards agreement with the IAEA, each of them has voluntarily accepted the application of IAEA safeguards to all or part of their peaceful nuclear activities along the lines of INFCIRC/153 (Corrected).

Rights and obligations. The conclusion of an NPT safeguards agreement between a State and the IAEA entails, sequentially, negotiation between the IAEA and the State on a draft text (usually straightforward because NPT safeguards agreements follow the standard INFCIRC/153 model); the approval of the draft agreement by the IAEA Board of Governors; signature of the text by the Agency's Director General and by the State's representative; and the registration of the agreement, when it has entered into force, with the United Nations. Agreements set out the Parties' basic rights and obligations relevant to the application of safeguards. These include the State's basic non-proliferation undertaking to be verified through safeguards application; its obligation to maintain a system of accounting and control for all nuclear material subject to safeguards; and an obligation to provide the IAEA with all information relevant to the application of safeguards. The agreements also include the IAEA's right and obligation to verify a State's compliance with its basic undertaking and, in so doing, to avoid hampering a State's economic and technological development. The IAEA is also required to protect such of the State's commercial, industrial, and other

*Other reports in this edition of the *IAEA Bulletin*, beginning on pages 3 and 21, focus on IAEA technical co-operation and Article IV of the NPT. Additionally, Article V of the NPT addresses the dissemination, through appropriate international procedures, of the potential benefits from any peaceful applications of nuclear explosions (PNEs). The IAEA is generally seen as the appropriate body in this connection. However, the potential for safe and peaceful applications of nuclear explosions has not been demonstrated and the IAEA is not currently engaged in activities related to PNEs.

	1975	1980	1985	1990	1994
Total number of States with safeguards agreement in force	64	86	96	104	118
Total number of States with NPT safeguards agreement in force*	46	69	78	86	102
Total number of safeguards agreements in force	106	139	163	177	199
Total number of NPT safeguards agreements in force	46	65	74	81	94

* The number of NPT safeguards agreements in force differs from the number of States having NPT safeguards agreements in force because in some cases one agreement can apply to more than one State (e.g. Euratom agreement).

States having NPT and other types of safeguards agreements in force with the IAEA

confidential information that becomes known to it in the course of safeguards implementation.

Detailed safeguards implementation procedures are set out in the "subsidiary arrangements" which are tailored specifically to the requirements of the facilities to be safeguarded. These technical documents — concluded between the IAEA and the State Party simultaneously with, or subsequent to the conclusion of, a safeguards agreement — are treated as confidential and are normally accessible only to the IAEA and to the State Party.

A basis for nuclear transparency

NPT safeguards are a form of institutionalized nuclear transparency through which the IAEA can provide assurance to the international community that a State's nuclear activities are being used exclusively for peaceful purposes. Thus, through the assurance given, safeguards promote confidence among States and help to strengthen their collective security. Safeguards are a technical means of assuring a political end.

The technical objectives of NPT safeguards are that the IAEA be able to detect, in a timely manner, a diversion of one significant quantity (SQ) of nuclear material from a State's peaceful nuclear activities and to ensure that all nuclear material subject to safeguards in the State is declared to the Agency. What constitutes a "significant quantity" is determined by the approximate quantity of any given type of nuclear material which, taking into account any conversion process involved, would be required for the manufacture of a nuclear explosive device. The "timely detection" of diversion refers to the maximum timeframe (determined by the "conversion time" required to convert different types of nuclear material into components of a nuclear explosive device) within which the IAEA seeks to detect any diversion from peaceful use.

Safeguards — with their main component parts of nuclear material accounting, containment and surveillance measures (i.e. the application of cameras and seals), and on-site inspection — are essentially an audit system. In keeping with all modern audit practices, they can provide opinions or conclusions but cannot "certify" compliance or predict a State's future intentions. Nor is the IAEA safeguards inspectorate a kind of nuclear police force with enforcement powers.

Since the NPT entered into force in 1970, the IAEA has been able to provide a high level of assurance of the non-diversion of nuclear material which has been placed under safeguards and to identify cases where safeguards obligations are not being met. At previous NPT conferences, it has been noted with satisfaction that, in carrying out its safeguards activities under the Treaty, the IAEA has not detected any diversion of a significant amount of safeguarded nuclear material from peaceful uses. NPT Parties have also affirmed their determination further to strengthen barriers against nuclear weapons proliferation and have urged the IAEA to take full advantage of its rights under safeguards agreements.

All this notwithstanding, major developments have taken place since 1990. They have highlighted the need to strengthen traditional approaches to NPT safeguards implementation; changed the political expectations of the safeguards system; led to measures designed to meet those new expectations; and have resulted in new kinds of verification functions for the IAEA.

Responding to rising expectations

Iraq's violations of its comprehensive safeguards agreement with the IAEA and of its NPT obligations revealed with painful clarity that although the safeguards system remained effective with regard to *declared* nuclear activities, it was not effectively equipped to detect *undeclared* activities — primarily because the system suffered from a shortage of information about any such activities. With the discovery of Iraq's clandestine enrichment and nuclear weapons programmes, it became very clear that, to work truly effectively, the safeguards system needed to be equipped not only to verify *declared* nuclear activities in a credible manner but also, to the extent possible, to provide assurance about the absence of *undeclared* activities: hence, the efforts that the IAEA has since been making — and continues to make — to strengthen safeguards through new measures focusing on access to information; to sites; and to the United Nations Security Council.

Access to information. The rationale underlying measures seeking to improve the IAEA's access to information is that, the more that is known about a country's nuclear activities, the more comprehensive the analysis and verification can be and the greater the degree of assurance that can be provided about non-diversion and about the absence of undeclared activities. The starting point is increased provision of information by the State itself supplemented by information that the IAEA obtains during its verification activities and other information available to it from other sources. For example, following the case of Iraq, information about the design of nuclear facilities must now be forwarded to the IAEA much earlier than hitherto to enable the Agency to have sufficient time in which to satisfy itself that such facilities are only for peaceful use and also to facilitate safeguards implementation. Additionally, a reporting scheme has been initiated, over and above the reporting requirements in NPT safeguards agreements, for exports and imports of nuclear material and specified non-nuclear material and equipment. This is to enable the IAEA to assess whether import and export patterns are consistent with other information available to it about States' nuclear programmes. Efforts are also under way to strengthen and develop the IAEA's information database by including within it *all* available information whether derived from open source literature; obtained through the Agency's verification activities; provided to the Agency by governments; or obtained elsewhere e.g. through commercial satellites. Measures to enhance the IAEA's analytical capabilities are also being taken.

Access to sites. Under comprehensive safeguards agreements, inspector access to carry out routine inspections is limited to "strategic points" in declared facilities, such points being those to which access is necessary for the implementation of safeguards measures. The Iraq experience showed that access limited in this way is insufficient to enable the detection of undeclared activities. Therefore in February 1992, the IAEA Board of Governors affirmed the IAEA's right, as provided for in safeguards agreements, to conduct "special inspections". In the course of these inspections, the IAEA has the right to have access, in keeping with the terms of the relevant safeguards agreement, to the additional information and locations it deems necessary for the fulfillment of its obligations under that agreement. Improved access is also being sought through encouraging States to make voluntary offers of access "any time, any place" to nuclear related activities.

Access to the UN Security Council. Access to the United Nations Security Council is of

particular importance when access either to information, sites, or both is not forthcoming. Under the IAEA Statute and in safeguards agreements, the Agency is obliged to report cases of non-compliance with safeguards obligations to the Security Council. It is then for the Council to decide what action to take. The cases of Iraq and of the Democratic People's Republic of Korea (DPRK) each elicited different responses from the Council. In terms of the IAEA's responsibility for implementing NPT safeguards, however, the case of the DPRK serves to illustrate the efficacy of some of the measures already taken, since Iraq, to strengthen the safeguards system.

Ongoing development of safeguards. The process of strengthening, and otherwise improving safeguards, was given further impetus by the report, submitted to the IAEA Director General in April 1993 by the Standing Advisory Group on Safeguards Implementation (SAGSI), containing recommendations for making safeguards more effective and more cost-efficient. Following consideration of the report by the IAEA Board of Governors, "Programme 93+2" has been established. Its goal is to present to the Board of Governors in March 1995, i.e. just prior to the 1995 NPT Conference, proposals for a more effective and efficient safeguards system with an accompanying evaluation of the technical, legal, and financial implications. It is possible to view the proposals now being developed in terms of clusters relating to the main areas of reform already undertaken. Thus, they centre on additional measures to strengthen the IAEA's access to information and to sites, and they also cover proposals for administrative streamlining. (*See the article beginning on page 14.*)

Support from NPT Conferences. It will be important for the 1995 NPT Conference to support and endorse what the IAEA is seeking to achieve through its safeguards strengthening measures. Previous NPT conferences have expressed or reaffirmed the conviction that safeguards play a key role in preventing proliferation and have commended the IAEA for the way in which safeguards implementation has been carried out in accordance with the principles of the Treaty and the more detailed provisions of NPT safeguards agreements, including the obligations upon the IAEA to respect the interests of the State.

The conferences have also welcomed the significant contributions made by States Party to the Treaty in facilitating application of safeguards and have recognized the critical importance of States continuing their political, technical, and financial support for the safeguards system. Such continuing support will be vital. Safeguards practices, procedures, and implementation have evolved progressively since the NPT entered into

force. The post-Gulf War discoveries of clandestine enrichment and nuclear weapons programmes in Iraq were a turning point. Providing assurance through effective safeguards that *declared* nuclear material is not diverted will continue to be the major part of safeguards work.

However, the efforts focusing on strengthening the IAEA's ability to detect the existence of *undeclared* nuclear material and facilities are based on the realization that the safeguards system as it used to be practiced is not enough today. The ultimate success of the collective endeavours to strengthen safeguards will depend essentially upon the extent to which parties to the NPT are prepared to grant the IAEA the necessary authority, co-operation, and resources.

Disarmament and related provisions

Articles VI and VII of the NPT are unlike its Article III in that neither of them invest the IAEA with *specific* responsibility for their implementation. Indeed, in this respect the onus under Article VI falls squarely upon the States Parties.

Under Article VI of the Treaty, "Each of the Parties to the Treaty undertakes to pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament, and on a treaty on general and complete disarmament under strict and effective international control."

Article VII of the Treaty does not impose any obligation upon States but notes that, looking towards the cessation of the nuclear arms race and nuclear disarmament foreshadowed in Article VI, "Nothing in this Treaty affects the right of any group of States to conclude regional treaties in order to assure the total absence of nuclear weapons in their respective territories."

It is generally recognized that responsibility for implementing Article VI of the NPT falls largely to its Parties that are nuclear-weapon States. They have been criticized at previous NPT conferences for insufficient efforts, either quantitatively or qualitatively, to stem what is generally called "vertical" proliferation.

However, there is no doubt that substantial progress has been made towards achieving the goals of Article VI since the end of the Cold War. In the present global detente, the major military powers are helping to settle regional conflicts rather than competing in them. Substantial cuts have been made in nuclear arsenals and others — particularly under the START II Treaty — are in prospect. Initiatives have also been taken, and others may follow, to submit to IAEA safeguards nuclear weapons material which is deemed to be excess to defense requirements. In 1993 the UN

General Assembly adopted, without a vote, a resolution calling for the negotiation of a "cut-off" agreement which would ban the production of fissionable material for weapons purposes.

The nuclear-weapon States Party to the NPT could make what might be a critical contribution to the prospects of NPT extension by agreeing on, or being party to substantial progress towards, a comprehensive nuclear test ban and/or on a cut-off of the production of fissionable material for weapons purposes. Success in each regard does not depend solely on NPT parties that are nuclear-weapon States because other States — some of which have *not* acceded to the NPT — are also involved. However, to the extent that nuclear weapons States continue to emphasize the importance of nuclear assets to national security, it is not unreasonable to deduce that the thinking of others could be coloured similarly — in the same way that progress towards nuclear disarmament can reinforce commitment to non-proliferation.

Comprehensive test ban. The measure which most NPT parties have put at the top of the arms control agenda for decades — especially at NPT Review Conferences — is a Comprehensive Test Ban Treaty (CTBT), which is now being negotiated at the Conference on Disarmament in Geneva. The choice of organization to verify compliance with an eventual CTBT will be a matter for the parties to that Treaty. However, the IAEA has a broad base of experience with and expertise in many of the administrative and technical issues arising in the context of a CTBT. Moreover, there is a good deal of overlap between the NPT and a CTBT. Non-nuclear-weapon States party to the NPT are already *de facto* parties to a CTBT in that they are prohibited from testing any nuclear explosive devices. Such devices cannot be manufactured without fissionable material. IAEA safeguards are applied to *all* source or fissionable material in all peaceful nuclear activities in a non-nuclear-weapon States party to the Treaty, and should thus be able to detect any diversion of material for the purposes of testing. Violations of a CTBT — as with violations of safeguards obligations — are likely to involve recourse to the United Nations Security Council.

Cut-off agreement. A cut-off in the production of fissionable material for weapons purposes does not in itself seem to be unrealistic. There is already concern about how to deal with the surplus direct-use material which will result from the nuclear disarmament accords already negotiated. A cut-off is also relevant to Article VI of the NPT.

Currently, there is no agreement on an appropriate negotiating mandate for a cut-off. If agreement is reached in the future, however, verifica-

tion of a cut-off would be consistent with the IAEA's mandate and with its NPT safeguards responsibilities in NPT non-nuclear-weapon States. Additionally, a non-discriminatory cut-off agreement of the kind foreshadowed by the 1993 UN General Assembly resolution would most logically include placing under effective international verification, all enrichment and reprocessing plants in NPT nuclear-weapon States and those in the "threshold States" which are *not* party to the Treaty. Taking all these factors into account, it is difficult to see any verification option *other* than through IAEA safeguards; a different solution would entail for some new or alternative mechanism — a major and very costly assignment, not least because verification at enrichment and reprocessing plants is extremely labour intensive. (*See related article on the cut-off agreement, beginning on page 49.*)

Under the nuclear disarmament accords already negotiated or in prospect, verification of the actual dismantling of nuclear weapons will have to fall to the military/industrial sectors. However, IAEA safeguards — and perhaps, special additional controls administered by the IAEA — can be used to verify the peaceful use or storage of fissionable material derived from such dismantling. Indeed, the United States has already unilaterally submitted some of its direct-use material, deemed excess to its defense requirements, to IAEA safeguards under its "voluntary offer" safeguards agreement pursuant to the NPT. Such measures — and others devised for the same purpose — are also consistent with Article VI of the NPT. Through them, the IAEA can provide credible assurance to the international community that the material in question does not find its way into new weapons.

Regional non-proliferation arrangements.

Article VII of the NPT reflects the significance of regional non-proliferation arrangements as a means through which confidence in and between States of a specific region can be established and nurtured, thereby complementing the global arrangements enshrined in the NPT itself.

The Treaty-based nuclear-weapon free zones (NWFZs) already established or in prospect provide for verification arrangements closely linked with safeguards implementation pursuant to the NPT. For example, the safeguards agreements which States Parties to the Rarotonga Treaty (in the South Pacific) must conclude with the IAEA "shall be, or shall be equivalent in its scope and effect to, an agreement required in connection with the NPT on the basis of the materials reproduced in document INFCIRC/153(Corr.) of the IAEA". Moreover, most safeguards agreements between the IAEA and the States party to the Treaty of Tlatelolco (in Latin America and the

Caribbean) have been concluded in connection both with the Tlatelolco Treaty and the NPT. Parties to future NWFZs will no doubt also develop specific verification scenarios based on their own regional requirements.

As more States become parties to different non-proliferation initiatives, the complementarity between regional nuclear verification arrangements and the global system which the IAEA implements could open up further possibilities for effective and cost-efficient verification of compliance with non-proliferation undertakings. In this respect, a binding commitment by the relevant States to keep Africa nuclear-weapon-free is now a realistic prospect, and a draft Treaty, now being negotiated, assigns to the IAEA the responsibility for verifying compliance. In the Middle East, the creation of an NWFZ is likely to come about only in the context of an overall peace settlement. However, there is already agreement among Middle East States about the potential value of such a zone in their region. There is also recognition of the ability of the IAEA to provide effective verification. Because of the particular characteristics of the political situation in the Middle East, however, arrangements for verification of compliance with a future NWFZ there are likely to be more far-reaching than those generally carried out by the IAEA. Parties to a future Middle East NWFZ might therefore consider it necessary to put additional, more intrusive verification arrangements in place.

An evolutionary process

In sum, global efforts to prevent the spread of nuclear weapons, and to reduce existing stockpiles of such weapons, have evolved progressively over the past 25 years in the light of specific political and technological developments. Key factors, during the 1990s, have been the end of the Cold War with all the accompanying geo-political obligations. Thus, the 1990s have highlighted the need for appropriate responses to new challenges and for more effective nuclear verification.

Response mechanisms include efforts to more fully utilize, and where appropriate strengthen, the safeguards capabilities of the IAEA, which has specific verification responsibilities under the NPT and which may be called upon to exercise new functions in years to come. Important steps have already been taken to strengthen IAEA safeguards, but much remains to be done. The success of these efforts ultimately will depend on the extent to which States, especially those Party to the NPT, are prepared to grant the IAEA the requisite authority, co-operation, and resources to help them meet the challenges ahead. □