

IAEA safeguards in nuclear-weapon States

A review of objectives, purposes, and achievements

by A. von Baeckmann

In the late 1960s, when the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) and the related safeguards measures were in an advanced stage of preparation, several industrialized non-nuclear-weapon States raised the concern that the safeguards required under the Treaty in non-nuclear-weapon States would place their nuclear industries in an unfavourable situation as compared with nuclear industries in nuclear-weapon States.* Their view was that safeguards would put additional economic burden on their nuclear industries, and that safeguards would increase the risk of industrial espionage and might jeopardize the confidentiality of not only proprietary information but also contractual relationships which the parties valued quite highly.

In order to overcome these concerns, US President Lyndon Johnson, in his speech on the occasion of the 25th anniversary of the first sustained fission reaction, stated on 2 December 1967: "We do not believe that the safeguards we propose (in the NPT) will interfere with the peaceful activities of any country. And I want to make it clear to the world that we in the United States are not asking any country to accept safeguards that we are unwilling to accept ourselves. So I am, today, announcing that when such safeguards are applied under the Treaty, the United States will permit the International Atomic Energy Agency to apply its safeguards to all nuclear activities in the United States excluding only those with direct national security significance". Similarly, the Minister of State for Foreign Affairs of the United Kingdom stated in the House of Commons on 4 December 1967: "In order to assist these negotiations (on NPT) Her Majesty's Government have decided that, at such time as international safeguards are put into effect in the non-nuclear-weapon States in implementation of the provisions of a treaty, they will be prepared to offer an opportunity for the application of similar

safeguards in the United Kingdom subject to exclusions for national security reasons only". The offer of US President Johnson was subsequently renewed and confirmed by his successors, Presidents Nixon and Ford.

By 1976, after IAEA safeguards agreements had been concluded with several major non-nuclear-weapon States party to the NPT which operated significant nuclear installations, the time had come to honour the promises and the United Kingdom of Great Britain and Northern Ireland entered into a safeguards agreement with Euratom and the IAEA.* In the preamble of that agreement, which came into force in August 1978, it is stated that the United Kingdom "has throughout desired to encourage widespread adherence to the Treaty (NPT) by demonstrating to non-nuclear-weapon States that they would not be placed at a commercial disadvantage by reason of the application of safeguards pursuant to the Treaty". Similarly a safeguards agreement between the United States of America and the IAEA was negotiated in November 1977 and brought into force in December 1980. In the preamble of this agreement, the reason for the United States having made the offer and having entered into the agreement is stated to be "to encourage widespread adherence to the NPT". In July 1978 France completed the negotiations of a safeguards agreement with Euratom and the Agency, which came into force in September 1981. In the preamble of this agreement it is stated that "with a view to encouraging the acceptance of such safeguards by an ever greater number of States, France is prepared to afford the Agency the opportunity to apply its safeguards on French territory by concluding with it an agreement for that purpose". In addition, the Union of the Soviet Socialist Republics and the Agency concluded a safeguards agreement in February 1985 which entered into force in June 1985. In the preamble of this agreement it is stated that "The Soviet Union has made this offer and has entered into this agreement for the purpose of promoting widespread adherence to the Treaty (NPT), further development of Agency

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* The term "nuclear-weapon State" is used in this article as defined in Art. IX.3 of the NPT for the purposes of that Treaty. For nuclear-weapon States party to NPT, the application of safeguards is not a requirement of the Treaty.

* See IAEA documents INFCIRC/263, INFCIRC/288, INFCIRC/290, and INFCIRC/327 for the agreements pertaining to, respectively, the UK, USA, France, and the USSR.

safeguards and encouraging their acceptance by an even greater number of States”.

Other reasons for the submission of civil nuclear facilities in nuclear-weapon States to IAEA safeguards were identified during discussions in Vienna in the years immediately following the opening of the NPT for signature in 1968. They included:

- To avoid discrimination between nuclear-weapon States and non-nuclear-weapon States in respect of their civil nuclear activities
- To enable corroboration of international transfers between nuclear-weapon States and non-nuclear-weapon States party to the Treaty
- To offer opportunities for training of inspectors and for the development of inspection techniques.

Additional reasons for the implementation of IAEA safeguards in nuclear-weapon States which were raised later in Member States relate to:

- The observation that, as a side effect, IAEA safeguards also promote confidence that nuclear material is properly controlled and protected by national authorities against diversion (or illegal withdrawal) by terrorists
- The principle of reciprocity in designating/accepting nationals of nuclear-weapon States as IAEA inspectors
- The observation that the risk of industrial espionage mentioned earlier may also include the possibility of espionage for purposes of terrorist acts or military attack.

From preambles of the four safeguards agreements concluded with nuclear-weapon States so far it is obvious that the main reason these States have entered into such agreements with the Agency was to promote the acceptance of IAEA safeguards by as large a number of States as possible, and to promote the universal application of IAEA safeguards to all nuclear material in all peaceful nuclear activities, at least in all non-nuclear-weapon States. Indeed, there is no doubt that the offers made and the later implementation of the offers constituted an additional inducement for certain countries to take the political step of accepting IAEA safeguards. It must, however, be recognized that during the last 10 years the process of extending IAEA safeguards gradually to all peaceful nuclear activities in all non-nuclear-weapon States has come to stagnation and that little progress has been made with respect to the universality of IAEA safeguards. On the positive side it remains to report that negotiations with the fifth nuclear-weapon State — China — on the conclusion of a safeguards agreement have reached an advanced stage.

Scope of IAEA safeguards in nuclear-weapon States

From the beginning of the discussions it was recognized that full inspection of all civil facilities in the nuclear-weapon States concerned would lead to inordinately high costs and that ways and means had to be found to satisfy the purposes of those agreements at minimized costs. It was therefore suggested that IAEA

inspections focus on those facilities of advanced design incorporating new technologies and on those which were sensitive in terms of international competition, and to minimize inspection of other offered nuclear facilities. At that time, it was suggested that in nuclear-weapon States only about one third to one fifth of the effort required, if full IAEA safeguards were to be implemented at all civil nuclear facilities, should be spent. In fact, even such a reduced level of safeguards implementation has never been reached. In the present situation of financial constraint it has been suggested to reduce even further the fraction of IAEA safeguards to be performed in nuclear-weapon States.

It must, however, be noted that other obligations on nuclear-weapon States to accept IAEA safeguards on certain nuclear material were included in the new agreements. All four agreements contain a clause by which the application of Agency safeguards under other safeguards agreements is suspended with the condition that the nuclear material being safeguarded under the new agreement shall be at all times at least equivalent in amount and composition to that which would be subject to safeguards under those other agreements. In addition, other bilateral or multilateral safeguards obligations of nuclear-weapon States can and have been included in the new agreements.

Although the purpose of application of IAEA safeguards in nuclear-weapon States is different from that of the application of IAEA safeguards in non-nuclear-weapon States, the text of the safeguards agreements with the nuclear-weapon States follows largely the standard text of the safeguards agreements required in connection with the NPT for non-nuclear-weapon States (INFCIRC/153).

The most important differences between the INFCIRC/153 model and the texts of the safeguards agreements with nuclear-weapon States relate to the safeguards objective (verification of non-withdrawal from civil activities, except as provided for in the agreement, vs. verification of non-diversion); the withdrawal clause (nuclear-weapon States may withdraw nuclear material from safeguards upon prior notification and at any time); the selection process and the list of eligible facilities, and some provisions related to international transfers.*

In addition, there are also significant differences between the four agreements, in particular concerning:

- The scope of application
- The fact that France is not a party to the NPT whereas the UK, USA, and the Soviet Union are parties to it
- The participation of the European Atomic Energy Community (Euratom) in the agreements with France and the UK.

In the UK and in the USA, the agreement has been extended to all nuclear material/activities/facilities — excluding only those with direct national security

* See INFCIRC/207.

significance. The agreement with France relates to nuclear material so designated by France. The agreement with the Soviet Union covers some peaceful nuclear facilities, namely several nuclear power stations and nuclear research reactors contained in a list provided by the Soviet Union. Whereas the agreements with the UK and France refer to the right and obligation of the Agency to ensure that safeguards are applied, the US and the USSR agreement refer only to the right of the Agency to apply its safeguards. Finally, the agreement with the USSR puts special emphasis on the objective of ensuring the further development and improvement of safeguards techniques.

Implementation of IAEA safeguards in nuclear-weapon States

The agreements for the application of IAEA safeguards in nuclear-weapon States are also different from other safeguards agreements in respect to the degree of implementation. Safeguards are implemented in non-nuclear-weapon States with respect to 100% of the material subjected to safeguards. For reasons of economy, the IAEA performs its safeguards in nuclear-weapon States only at a fraction of the facilities that contain nuclear material eligible for safeguards. The selection of the facilities in which IAEA safeguards are actually implemented in nuclear-weapon States is, *inter alia*, based on the following principles:

- Fulfillment of safeguards obligations related to other agreements suspended under the suspension clause and other obligations accepted by the individual nuclear-weapon State.
- Facilities of advanced design which would provide best opportunities for training, safeguards development, and facilities which are sensitive in terms of international competition.
- Application of the rotation principle to the extent possible in order to avoid discriminatory treatment between similarly situated facilities within a State.
- Cost should be kept at the lowest level consistent with the purposes of the agreements.

In application of these principles, IAEA safeguards inspections were performed in 1986 in the USA at one light-water reactor (LWR) fuel fabrication plant and two power reactors; in the UK at one enrichment plant using ultracentrifuge technology, one spent-fuel storage pond, and one plutonium storage facility; in France at one spent-fuel storage pond of a reprocessing plant; and at one power reactor and one research reactor in the Soviet Union. About 900 man-days of inspection effort have been used in 1986 for inspection in these facilities as compared to about 7400 man-days of inspection in facilities located in non-nuclear-weapon States.

A major fraction of the inspection effort used in nuclear-weapon States is related to facilities selected in accordance with the first principle mentioned above. The application of IAEA safeguards to the enrichment plant in the UK, the fuel fabrication plant in the USA,

and a most modern power reactor in the Soviet Union were good examples for the implementation of the second principle and some part of the inspection effort spent at these facilities was related to inspector training and development of safeguards techniques. In particular, the development of the "yes/no" measurement technique for determining the absence of highly enriched uranium in UF₆ pipes in the UK enrichment plant must be mentioned as an example for the successful development of new safeguards technology within the framework of safeguards implementation in a nuclear-weapon State. In addition, the IAEA has gained some valuable experience and new concepts from the application of its safeguards in nuclear-weapon States. The experience has been gained not only from the inspections but also from the negotiation of subsidiary arrangements including facility attachments and from advanced techniques related to reporting of large nuclear material inventories and inventory changes.

Outlook and prospects

The wisdom of applying IAEA safeguards on nuclear material in nuclear-weapon States has frequently been questioned. Certainly it does not make a direct contribution to non-proliferation, and it provides the assurance of non-military use of only a small fraction of nuclear material in the States concerned, and even this can be withdrawn from the scope of safeguards by simple notification. But there is no doubt that the application of IAEA safeguards in nuclear-weapon States has contributed significantly to the acceptance of safeguards in other States,* and to the development of IAEA safeguards concepts and techniques. In addition, the application of IAEA safeguards in nuclear-weapon States has further improved in these States the understanding of safeguards-related problems and results, and opened an avenue for the introduction of international verification activities in those States. In 1985 the NPT Review Conference expressed its satisfaction that four of the five nuclear-weapon States have voluntarily concluded safeguards agreements as further strengthening the non-proliferation regime and increasing the authority of IAEA and the effectiveness of its safeguards system.** The Conference also recommended the continued pursuit of the principle of universal application of IAEA safeguards to all peaceful nuclear activities in all States. To this end, the Conference recognized the value of voluntary offers and recommended further evaluation of the economic and practical possibility of extending application of safeguards to additional civil facilities in the nuclear-weapon States.

For the future it can be hoped that the implementation of IAEA safeguards in nuclear-weapon States will gain

* See for example paragraph 18 of the declaration made by the Government of the Federal Republic of Germany in connection with its signature of the NPT.

** NPT/CONF.III.64/I, Annex I, Article III(5).

more importance as soon as nuclear weapon reduction and control agreements come into force. Under those circumstances, the universal application of safeguards on all nuclear material in all peaceful nuclear activities will have direct relevance because this will permit the international verified interruption of the flow of nuclear material from civil activities to military activities. In addition, the universal application of IAEA safeguards in the nuclear-weapon States would assure that all nuclear material transferred from military application to civil use will permanently remain in peaceful utilization. Under those circumstances, IAEA safeguards may make an additional substantial contribution to a comprehensive system of international peace and security.

Finally, whatever the progress in nuclear arms limitation might be, the application of IAEA safeguards in nuclear-weapon States contributes significantly to maintaining confidence in promises which have been made at the time the NPT was launched, and thereby improves the trustworthiness of international relationships.

The future of safeguards under INFCIRC/66/Rev.2

Non-NPT safeguards agreements may deserve more attention

by C. Buechler

When the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) came into force in 1970, the general expectation was that the IAEA's safeguards activities would quickly fall under its aegis, and that the Treaty's associated safeguards document would soon replace the IAEA's existing one — known as INFCIRC/66/Rev.2 — as the basis for safeguards agreements. (*See box on page 26 for an overview of the types of safeguards agreements.*) Perhaps for this reason the problems related to non-NPT safeguards agreements have received less attention than they deserve.

While the actual implementation of safeguards under INFCIRC/66/Rev.2 agreements has in no way been neglected, problems inherent in the system either have not been solved or have been the subject of ad-hoc solutions not wholly satisfactory. Although the expectation has largely materialized that all non-nuclear-weapon States would ratify the NPT or the Tlatelolco Treaty (which establishes a nuclear-weapon-free zone in Latin America), a handful of very significant cases remains. Conditions enabling such ratification may yet come about. Yet it would seem prudent to review alternative ways of improving the implementation of safeguards in the States concerned.

The fraction of all Agency safeguards activities carried out under agreements of the INFCIRC/66/Rev.2 type has decreased over the last decade, as Member States have become party to the NPT or Tlatelolco Treaty, and it is today relatively small. From the point of view of non-proliferation, however, these activities are significant because they are carried out in some States which are technologically advanced and because, in some of these States, nuclear facilities are operating that are not subject to safeguards and have the potential of being used for non-peaceful purposes. Despite this significance, such safeguards activities are often less effective and efficient than they could be. This is because the agreements that regulate them are not up to modern (safeguards) standards; they frequently differ significantly from each other; and they often overlap, resulting in duplicate safeguards requirements and difficulties for the Agency in its effort to comply with some of its obligations. Further, the presence of unsafeguarded facilities has sometimes led to the adoption of safeguards approaches which (as they take into account such presence) call for safeguards measures in addition to those that would otherwise be required. These facts result in disadvantages for Member States as well as for the Agency, and detract from the most effective use of the Agency's limited resources.

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