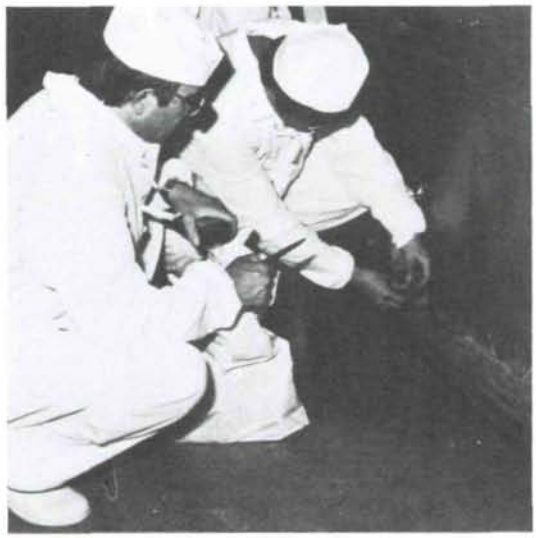
▲ During an inspection exercise in the USSR, IAEA staff and new inspectors measure the uranium content of a fresh VVER-400 fuel assembly using a uranium neutron coincidence collar. (Credit: USSR State Committee on the Utilization of Atomic Energy)



◄ During an inspection at the Kozloduy nuclear power plant in Bulgaria, Agency inspectors apply an IAEA seal to the reactor missile shield, and service a surveillance camera. (Credit: Kozloduy nuclear power plant, Bulgaria)
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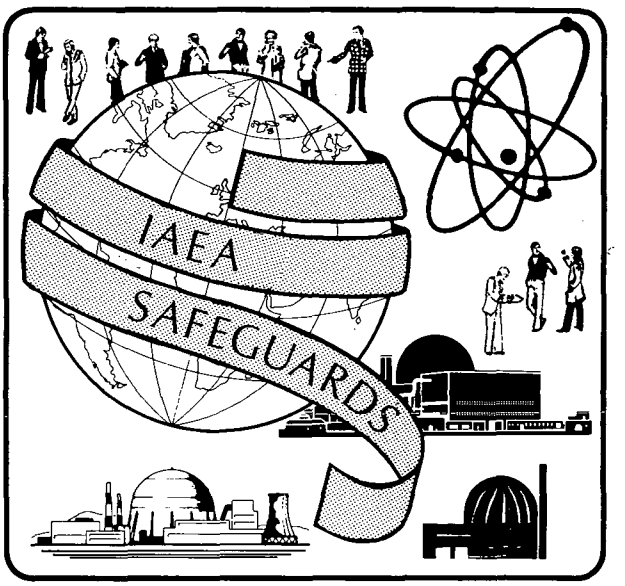

IAEA safeguards — a 1988 perspective

A perspective on the "assurance versus deterrence" debate

by Jon Jennekens

The IAEA has been confronted with an extended period of zero real growth. Under these circumstances, the continuing scrutiny applied to the Agency's safeguards programme assumes added importance. The imposition of financial constraints in any organization is a primary factor in forcing the re-examination of priorities. Such re-examination is particularly relevant at this time, not only because of financial considerations, but also because there have been suggestions from a number of quarters that certain aspects of safeguards may have been over-emphasized at the expense of others in developing the Agency's current implementation approaches. One such aspect is the essential balance between the safeguards measures needed to achieve timely detection in case of a diversion and those required for confirmation of non-diversion. Over the years, this subject has been discussed somewhat simplistically in terms of the perceived needs for deterrence and assurance respectively.

Early interest in detection and control

Slightly more than four decades ago, the first attempts were made at developing an international agreement on measures to limit the spread of nuclear weapons. The general thrust of these initiatives was characterized by the use of words such as "detect", "prevent", "prohibit", "diversion", "control", and "clandestine". Almost 10 years passed before the continuing efforts of several States resulted in agreement on the Statute of the International Atomic Energy Agency. Not surprisingly, the safeguards objective of the Agency reflects the realization that the early notion of an international organization which would own and physically possess all nuclear material of interest was simply not viable. Verification of national activities supplanted international ownership and control.

Any attempt to explain the very complex, multi-dimensional considerations and factors which influenced the early development of the Agency's safeguards system is certain to be challenged on a variety of grounds. Suffice it to say, therefore, that the fact that 5 years elapsed following the founding of the Agency before it conducted its first safeguards inspection, was due, in part, to the prolonged consultations which preceded the issuance of document INFCIRC/26 ("The Agency's Safeguards") in 1961. These consultations included debate on the purpose, scope, and nature of the technical measures to be applied during safeguards inspections. Many Member States expressed reservations about the underlying emphasis being placed by several others on the detection of diversion and deterrence objectives of safeguards as compared to the verification and assurance objectives. Among those which held such reservations could be found a number of supplier States which wished to ensure that the "peaceful use only" obligations in their bilateral and multilateral co-operation agreements would be fulfilled. In this they were joined by many other States for whom the further proliferation of nuclear weapons was simply unacceptable. These reservations remain evident today.

The Safeguards Committee

The Safeguards Committee (1970) which drafted document INFCIRC/153 ("The Structure and Content of Agreements between the Agency and States Required in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons") was quite aware of the assurance versus deterrence debate. It endeavoured to develop a

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balanced approach in drafting the various provisions of INFCIRC/153 recognizing the validity of some of the arguments and counter-arguments of the debate, and more importantly, the need for the document to incorporate comprehensive provisions which would enable the Agency to retain flexibility and to exercise discretionary judgement in its safeguards programme. Although the recollections of participants about the intentions of the Safeguards Committee differ, it is evident that the Committee sought to ensure that IAEA safeguards, above all other considerations, would be internationally credible and thus characterized by:

- Independent verification of results and conclusions
- Close co-operation with parties with whom it must interact
- Objectivity
- Technical and legal correctness
- Effectiveness
- Efficiency.

The attainment of these characteristics requires that priority be placed upon independent verification. However, none of these characteristics call for an adversarial relationship between the Agency and Member States which have entered into safeguards agreements. This is important in assessing the perception of some that the "timely detection of diversion" and "deterrence of such diversion" — two aspects of INFCIRC/153 safeguards provisions — may have been over-emphasized. This perception has developed, in part, from the use of diversion path analysis techniques which place considerable emphasis on certain contentious hypothetical scenarios.

Examples of such hypotheses are:

- The probability that a State might attempt a diversion of safeguarded nuclear material, although small, exists
- The possible existence of undeclared (i.e. clandestine) facilities
- The possibility of a secret agreement between States to divert.

While some States see these hypotheses as an affront to their honesty, integrity, and, perhaps more importantly, their commitment to Agency safeguards, it is important to recognize the relevance of the analysis of potential diversion strategies to the credibility of the Agency's safeguards system. Many safeguards experts maintain that far from implying a question of integrity, such analyses constitute a bulwark of credibility because they help to define and determine the technical prerequisites for achieving a meaningful level of verification of the peaceful use of declared material.

Nevertheless, States which have ratified the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), or which have undertaken equivalent, internationally credible, non-proliferation obligations and provided binding assurances regarding these commitments, may question the continued application of such analyses. This is understandable notwithstanding the arguments that diversion path analyses have been developed in the interest of achieving thoroughness in safeguards implementation, have long been an integral part of the effort to achieve a credible safeguards system, and constitute a scientifically sound approach whose benefits balance if not outweigh its costs.

In applying diversion path analysis techniques, the Secretariat, and others, have tended to emphasize several provisions of Part II of INFCIRC/153 which deals with implementation. As a consequence, the "timely detection" and "deterrence" aspects of safeguards have become prominent and are even seen by some to be the overriding objectives of safeguards. This trend has been criticized by others as diminishing the importance of the basic undertaking of States set forth in paragraph 1 of Part I of INFCIRC/153 which is the *sine qua non* of all safeguards agreements concluded pursuant to the provisions of the NPT. In this context, paragraph 7 of INFCIRC/153 specifies the means by which compliance by a State (with the basic undertaking of paragraph 1) is to be verified. It requires the State to establish a system of accounting for and control of all nuclear material subject to safeguards and thereby to enable the Agency to verify the findings of the State's system.

Those who focus on paragraph 7 maintain that it is a very clear, unambiguous statement that safeguards are intended to be a retrospective confirmation of non-diversion, much as the activities of an external auditor are a retrospective confirmation of the correctness, completeness, and continuing validity of the financial statements, accounts, records, and reports of the assets and dispositioning of the resources of a company or government entity. Their view is that safeguards should be assurance-oriented, and in that context, safeguards should have a two-fold function: (1) to verify in an independent, technically correct and comprehensive manner that States are complying with their safeguards undertakings, and thereby, to provide meaningful evidence from which all States can draw conclusions regarding the assurance of non-diversion; and (2) to assist individual States or groups of States to provide valid evidence, on a continuing basis, that they are complying with their safeguards undertakings.

A personal perspective

These arguments are not to be taken lightly. However, as many safeguards practitioners firmly maintain, the principles, criteria, and practices which govern an "assurance-oriented" approach are quite analogous to those of a "deterrence-oriented" approach. They consider it incorrect and ill-advised to single out for attention one or a small number of provisions in INFCIRC/153, and that the entirety of the document must be considered in evaluating established safeguards procedures and practices. This is a singularly important point when one takes into consideration that INFCIRC/153 was the product of an international consensus — a result of a prolonged effort by 53 Member

States to provide guidance to the Director General on a matter of fundamental significance.

In so far as the argument favouring greater emphasis on the verification of the "findings" of State systems of accounting and control of nuclear material is concerned, it is also important to recognize that undue reliance on such systems would be quite unwise because of the essential requirement for IAEA safeguards to be a comprehensive, technically correct and rigorous, independent verification of the nuclear material accountancy and operating records and reports on the use and dispositioning of nuclear material in States. Without this requirement being fulfilled, the credibility of IAEA safeguards would vanish.

It has been suggested that the different approaches discussed above are more a question of semantics than of strategy. But that, too, is hypothesis and it does not mean that review and re-examination are out of order; indeed, the very nature of international safeguards as a novel and evolving verification system demands continuing evaluation and assessment in the interest of assuring that effective and efficient verification is provided to the international community.

Without question, any re-examination of safeguards approaches should reflect the non-proliferation and safeguards *bona fides* of States which, in the full exercise of their sovereignty, have undertaken exemplary obligations as an expression of their continuing commitment to the safeguards objectives of the IAEA. Equally, this re-examination should be conducted with the realization that safeguards must be sufficiently independent, comprehensive, and thorough as to detect the occurrence of a diversion with the high degree of probability required by Member States. If these technical requirements are fulfilled, the objective of assurance of non-diversion can be achieved and the inherent deterrent effect, if necessary, would result.

In my view, a rigorously implemented safeguards system, oriented towards the assurance of non-diversion by virtue of the verification of non-diversion, will provide as a concomitant, any necessary element of deterrence. Such a system is no more costly than its alternatives but it is self-evidently more appropriate and therefore more widely acceptable. As a consequence, the current safeguards programme of the Agency should continue to be implemented, as it has evolved, but with an enhanced appreciation of the essential differences between an assurance-oriented approach as compared to a deterrence-oriented approach and with clear emphasis on the former.