Potential and limitations of international safeguards

by H. Grümm*

The military attack in June last year on a research reactor under construction in Iraq once again drew the IAEA safeguards system into the public arena. Unfortunately, we found ourselves somewhat unprepared for this kind of discussion, and at a disadvantage because we had no sensational stories to tell. The debate showed *inter alia* that widespread misunderstandings exist about both the potential and the limitations of international safeguards.

In many instances, expectations of what safeguards can do are rather inflated, and confrontation with the limitations of safeguards often leads to the other extreme – disappointment and harsh criticism. We have to admit that misunderstandings are, to a certain extent, engendered by the commitment of the IAEA to talk about sensitive safeguards matters only to its Board of Governors, and by our habit generally of talking only in professional language.

However important the question of communication, the issue which really matters to all of us is to have the assurance that nuclear material will be used only for peaceful purposes. In most instances the acquisition of nuclear weapons is motivated by considerations of national security or feelings of prestige. Since 1945 various policies have been tried to discourage the spread of nuclear weapons, including classifications of know-how, embargoes, political action and pressures. All these measures were unable to prevent the emergence of five nuclear-weapon states, and are doomed to fail in the long run. To give but one example: the strict security classification of the technology of uranium enrichment diffusion has been by-passed by gas centrifuges, accessible even to developing countries; in spite of strict embargoes South Africa has succeeded in producing high-enriched uranium for its research reactor, and eventually low-enriched material for its power plants. There are already many states able to produce material suitable for nuclear weapons without external support. Their number will increase yet further with time.

In spite of the rather limited success of the policies of denial, it need hardly be said that sensitive material, equipment, and know-how, should be exported only in a carefully considered manner and under strict safeguards, preferably full-scope. Clearly, however, non-proliferation is not really a technical, but a political problem. As experience has shown, among the various conceivable instruments of non-proliferation policies (e.g. denial, detente, security arrangements, assurances of supply), the most reliable barrier against proliferation is the concerted political action of states who understand that it is very much in the interests of their own security not to acquire nuclear weapons. 114 non-nuclear-weapon states have demonstrated this conviction by adhering to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT). Those among them having nuclear activities have agreed to safeguards with the IAEA covering all these activities. The IAEA acts thereby as an objective international auditor entrusted with the task of verifying that the states are faithfully abiding by their non-diversion commitment. This system helps dissipate international mistrust – one factor which might lead countries to consider acquiring nuclear weapons.

Safeguards system is unique

Any activity in the real world has its limitations and the verification activities of the IAEA are no exception. First of all, safeguards cannot be imposed on any state – certainly not by the IAEA. We should be aware that the safeguards system is unique in international relations. It is the first time in the history of our restless species that sovereign states have voluntarily agreed to the inspection of sensitive facilities by foreign nationals. It is, therefore, no surprise that even NPT states will accept inspections only under clearly stated legal and technical constraints derived from international consensus and spelled out in safeguards agreements. It is politically naïve to assume that substantial changes in the basic documents affecting the rights of states would be accepted in the foreseeable future. Also, it should be understood that the effectiveness of safeguards depends to a certain extent on the co-operation of state officials and facility operators with the IAEA.

Equally, the IAEA's budget imposes limitations on the manpower and equipment resources of the Inspectorate. This year, the annual budget of US $25 million for the Safeguards Department is about the cost of of a single military aircraft. In view of the firm determination of many Member States to consider only zero-real-growth IAEA budgets, no substantial increases can be expected in the near future. To develop new equipment we are, therefore, heavily dependent on the generous support programme of some Member States.

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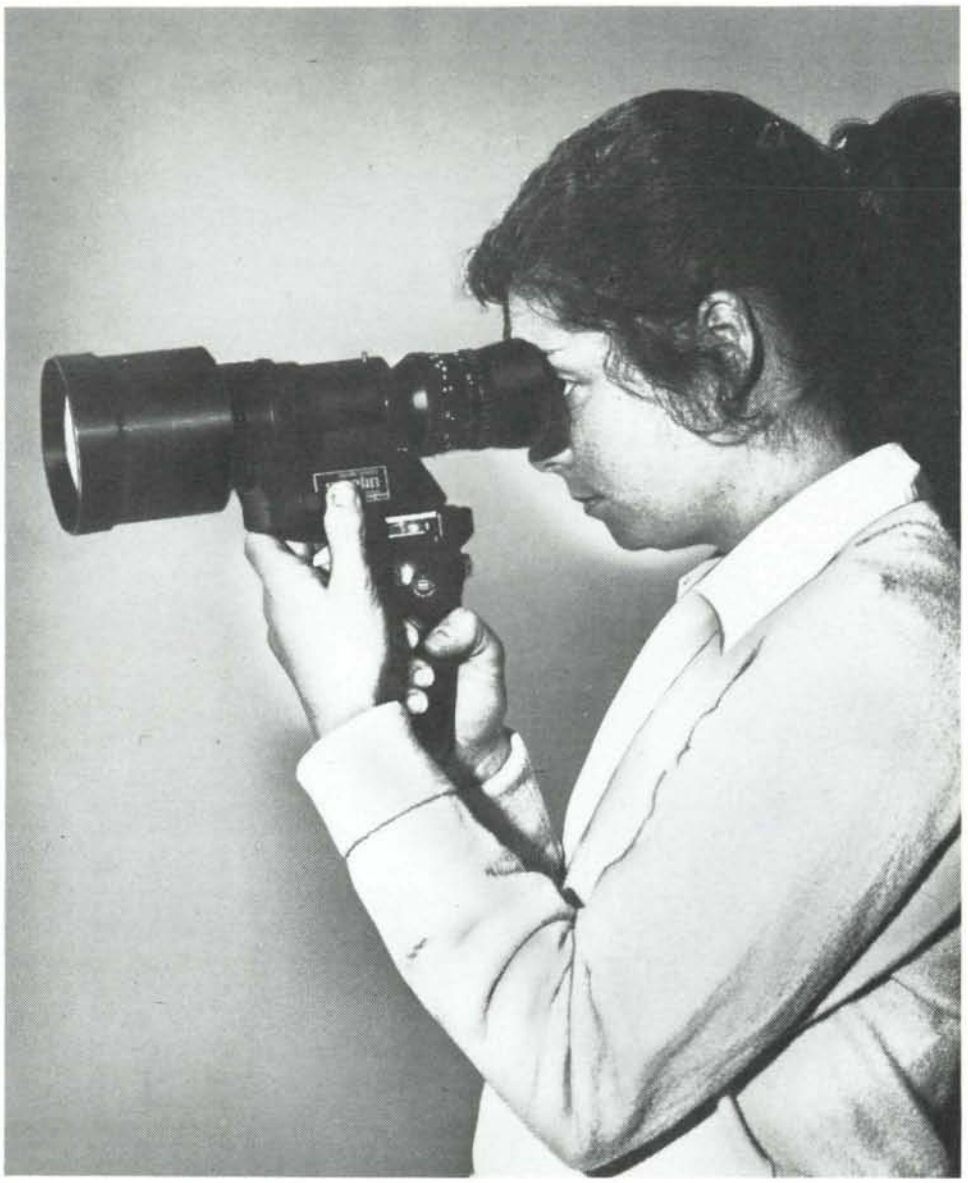
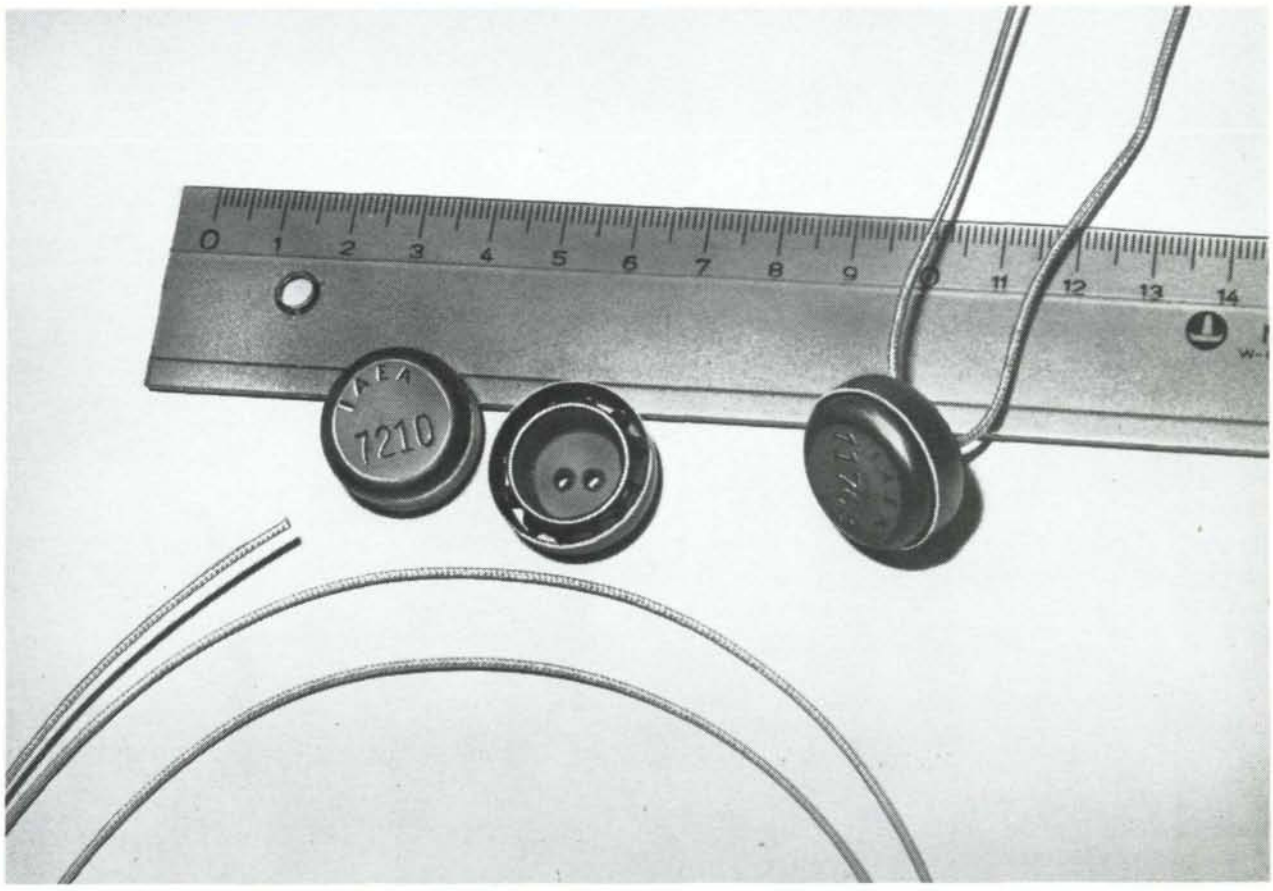


Using modern technology and modern electronics, new high-performance instruments are being developed for safeguards work. The photograph shows one such instrument, an image intensifier which can be used to check the Cherenkov glow of spent fuel elements in storage ponds. For the development of such instruments, which started only a few years ago, the Agency is dependent on the support programmes of Member States.

Because of these limitations, we were only able to carry out about 5060 inspection man-days in 1981. That is only slightly over half the inspection activities determined under the existing agreements. Nevertheless, safeguards are now considered as an important confidence-building measure and their deterrent effect should not be underestimated*. In assessing their strictly technical limitations, it must also be remembered that the development of professional equipment specifically for safeguards purposes started only a few years ago.

The external constraints imposed on the Inspectorate are compounded by internal difficulties. Efficient management is somewhat difficult in an international environment with a high turnover of staff and in the face of a complex and novel task to be implemented at the interface between technology and politics. However, international safeguards should not be regarded as a static phenomenon; they are an evolving endeavour, only about a decade old as a profession. In this short period of time, safeguards approaches for a dozen types of nuclear facilities and for hundreds of individual facilities have been elaborated, negotiated, and implemented. In spite of the limitations discussed above, in about 3 to 4 years' time 65 to 70% of the inspection commitments could be met and high-performance equipment – the result of comprehensive support programmes – should be available. In the meantime, we try to make optimum use of our limited resources by concentrating our efforts on those parts of the fuel cycle – about 25 facilities from among the 800 under safeguards – where large amounts of sensitive nuclear material are handled in readily accessible form.

* At its 25th session, in connection with the Iraq incident, the IAEA General Conference reaffirmed "its confidence in the effectiveness of the Agency safeguards system as a reliable means of verifying peaceful use of a nuclear facility".



A seal, such as the one shown in this photograph, is a very simple but effective way of ensuring that the nuclear material stored in a container has not been tampered with since the seal was applied. These seals are inexpensive, small, and easy to apply, although they have the disadvantage that their integrity cannot be checked on the spot. Over 4000 seals were applied and subsequently verified by the Agency's safeguards inspectors in 1981.

If a comparison is made between the present safeguards system, still developing and limited by external and internal constraints, and the important role it has to play, it is understandable that real concern should be shown. However, the picture looks less gloomy if the effectiveness of the system is considered not in a purely academic way but in the light of the situation in the real world. In the first instance, it should not be forgotten that non-proliferation efforts supported by safeguards have been and continue to be successful, mainly thanks to the self-restraint and co-operation of many states. Since 1964, that is for 18 years, no new nuclear-weapon states have emerged. Only the Indian nuclear explosion eight years ago, using non-safeguarded material, has to be noted. The event has not been repeated. Moreover, the system of agreements and inspections has made the proliferation-risk areas of the world very transparent, and permits concerted deterrent action by the IAEA Member States.

Proliferation risk greatest where safeguards end

It should not be forgotten that the reports and conclusions of the IAEA are not the only source of information available to Member States. They may have their own national means for detecting unsafeguarded nuclear activities; they may take into account the internal and external stability of states, and assess their political intentions and their technological capabilities. If, for example, a country has only light-water reactors supplied from outside, it is physically unable to separate plutonium from spent fuel and to divert it. In this case, the physical impossibility provides its own assurance, in spite of the fact that at present the IAEA's Inspectorate can spend only 6 to 8 inspection-days annually at this type of facility instead of about 12 days prescribed by the model approach. This theoretical deficiency enables the Inspectorate, on the other hand, to concentrate its efforts on reprocessing plants where plutonium is being separated.

If, in the light of all the information thus at its disposal, any interested government considers the 114 non-nuclear-weapon states which are parties to the NPT, and which have thereby voluntarily agreed to submit their nuclear activities to international full-scope safeguards, it will see that 39 of these actually have significant activities, all of them under Agency safeguards. It will find that for these states, as long as there are no basic changes in international relations, incentives for diversion are limited to very few cases, if any. It will be of greater concern to the government in question to observe that not all states with nuclear activities are presently prepared to accept the NPT or any other full-scope agreement. In

six non-NPT states all essential nuclear activities are, according to published information, under safeguards. These *de facto* full-scope safeguards enable the IAEA to carry out crosschecks, which facilitates the work of the Inspectorate. However, the states concerned are legally entitled – except to the extent that they are circumscribed by supply agreements – to build unsafeguarded nuclear facilities which may produce or will be able to produce weapons-usable material. Finally, the interested government in question may be seriously concerned about the fact that four states are already operating or building non-safeguarded nuclear facilities capable of producing weapons-grade material and that the available stockpile of such material may be considerable.

Thus, seen from the perspective of a well-informed government, the IAEA's safeguards system is in a somewhat peculiar situation. More than 90% of the effort of the Inspectorate is concentrated on facilities which operate in societies with a firm political commitment not to proliferate. The remaining effort is devoted to facilities in countries that have not made that commitment, and finally, the facilities representing a real proliferation risk are not accessible to inspection. Thus, the risk of proliferation is greatest where safeguards end.

It seems to be already well understood that safeguards cannot prevent the diversion of nuclear material or withdrawal by a state from a safeguards agreement. The system cannot predict future political intentions and decisions. It is an *ex post facto* warning system. It has been stated by some of the media that the IAEA is not living up to this task. This is incorrect. In its Annual Report and Safeguards Implementation Report the Agency has for years pointed to the non-safeguarded facilities operating or under construction in various countries. In September 1981, it reported to its Board of Governors that it is presently not in a position to safeguard two power reactors adequately. The international political reaction was and still is rather muted.

One of the objectives of safeguards is to deter proliferation by the risk of early detection. However, detection *per se* has only a very limited deterrent effect. Deterrence has to be provided by predictable, quick, and effective, international political reaction when the IAEA blows the whistle. Both elements, detection by the IAEA and political reaction, are necessary. It is to be doubted that the effectiveness of IAEA safeguards is really the weak link in this interaction. In any case, we in the Agency do everything to further improve the effectiveness of safeguards activities. In order to succeed, international safeguards need the continuing support of the Member States of the Agency and also the reasoned appreciation by the mass media of its proper irreplaceable role.

The IAEA's safeguards system is unique: it is the first significant attempt to combine agreements on arms control with objective and effective verification that each country is complying with the obligations stipulated in the agreements to which it is party.