IAEA Safeguards: A Look at 1970-1990 and Future Prospects *by Jon Jennekens*

Twenty years ago, in an article published in the IAEA Bulletin Jon Jennekens looked at how the entry into force of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) in 1970 had influenced the IAEA's safeguards activities.

Fears that nuclear weapons would spread to many countries have fortunately not come true. To an important degree, the application of international safeguards has furthered this reality. For the IAEA, the operation of an effective worldwide safeguards system is a great responsibility, one that has been carried out over the past quarter century.

Even after 25 years, new challenges arise: Complicated installations are built that handle large quantities of fissionable material which have to be safeguarded. Verification techniques which were once satisfactory become obsolete. Today's political developments as well — for example, the discussion of disarmament on many fronts — have opened up a much greater general readiness to accept verification than was true when the safeguards system began in the 1960s. IAEA safeguards will benefit both in cost efficiency and credibility if they are allowed to keep up with the advances made in other verification schemes.

Over the past decade, these developments, coupled with financial limitations, have seriously tested the IAEA's capability to carry out effective safeguards operations. Necessarily, the Agency has undertaken a number of steps to increase the overall effectiveness of its safeguards work. New diversion scenarios and safeguards concepts for larger and more complex nuclear facilities have been defined, for example, and safeguards at such plants have been updated. A safeguards information system has been introduced for the computerization of all safeguards data, which has greatly improved record handling and evaluation activities. Simultaneous inspection of all facilities in certain countries has been developed to the point of routine application. This procedure has resulted in improvements in safeguards effectiveness.

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In 1970, the IAEA's "Safeguards Committee" was established to elaborate guidelines for use by the Director General in concluding safeguards agreements envisaged in Article III of the NPT. Before then, the safeguards "system" was largely based on the acceptance of safeguards by States receiving nuclear material or equipment from other States for specific projects. Prior to 1970, the scope of safe-

guards implementation was largely limited to individual nuclear installations involving specific quantities of nuclear material and materials and equipment especially designed or adapted for use in nuclear research, development, and industrial activities.

In contrast, the safeguards required by the NPT apply to all source or special fissionable material in all peaceful nuclear activities in non-nuclear-weapon States. The entry into force of the NPT thus brought about an important change in the demands placed upon the Agency. Other changes also affected the Agency's safeguards activities. Before 1970, the nuclear materials subject to IAEA safeguards were either highly enriched uranium (HEU) in the form of fuel elements for research reactors, or relatively small quantities of natural uranium intended for use in research and development facilities and "pilot" production facilities. Other than a dozen or so industrialized States with fledgling nuclear power programmes, there were only 10 or 12 developing countries pursuing nuclear research and development programmes. As a result, there were only isolated instances of international traffic in nuclear materials and equipment.

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In 1970, the reporting of safeguards inspections was done in a relatively simple format that summarized inspection activities and their results. Details of the activities and the "depth" of the inspection were reflected in the inspection report filed by the individual inspector.

In later years, inspection report forms were improved in the interests of consistency, completeness, and reduction of the narrative component. Today's form, commonly called a "logsheet", records all information required for computerized inspection reports.

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Most certainly, the Agency's technical capabilities will need to continue to improve in tune with technological advances being made in nuclear materials measurement and accounting systems. Equally, the trend to computerized nuclear materials handling, processing, and storage systems — with a consequently reduced accessibility to these materials for verification purposes — will force further changes in the interfaces between the IAEA's Inspectorate, the national regulatory authorities of Member States, and the operators of nuclear facilities.

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The 1970 Safeguards Committee

In April 1970, the IAEA Board of Governors adopted a resolution calling for establishment of a Safeguards Committee to formulate guidelines for safeguards agreements in connection with the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), which had been opened for signature in 1968 and whose entry into force was imminent.

The Treaty assigns to the IAEA the responsibility of applying safeguards to nuclear material in all nuclear facilities in States that become NPT parties for the exclusive purpose of verification of the fulfillment of their obligations under the Treaty.

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Thus, the future prospects for IAEA safeguards are quite bright, albeit with a not unexpected degree of uncertainty. The continuing importance of IAEA safeguards as a bulwark of the nuclear non-proliferation efforts of the world community is beyond question. States which have undertaken comprehensive safeguards obligations firmly believe that IAEA safeguards provide the only broadly international and therefore credible means of verifying the peaceful nature of their nuclear activities. Those States which have chosen not to undertake such comprehensive safeguards obligations are not asked to forego the many humanitarian benefits of nuclear energy and ionizing radiation, but only to strengthen the already wide-reaching safeguards programme of the IAEA.

The two decades of the 1970s and 1980s have provided striking evidence of the near universal belief in the value of IAEA safeguards. Hopefully, the decade of the 1990s will see the joining together of all States in a truly universal undertaking of a system of verifying the non-diversion of nuclear materials to non-peaceful purposes.

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