

The IAEA's Additional Protocol

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With International Atomic Energy Agency (IAEA) Board of Governors approval of the Protocol Additional to Safeguards Agreements (INFCIRC/540) in May 1997, an extensive three and a half year development programme (called "Programme 93+2") for strengthened and more efficient safeguards came to conclusion. Programme 93+2 has been a major effort by the IAEA Secretariat and included the direct involvement of the Standing Advisory Group on Safeguards Implementation (SAGSI) and a large number of member states.

Ultimately the strength of the safeguards system depends upon three interrelated elements:

- the extent to which the IAEA is aware of the nature and locations of states' nuclear and nuclear-related activities;
- the extent to which IAEA inspectors have physical access to relevant locations for the purpose of providing independent verification of the exclusively peaceful intent of a state's nuclear programme; and
- the will of the international community, through IAEA access to the United Nations Security Council, to take action against states that are not complying with their non-proliferation commitments.

Since 1991, IAEA access to the Security Council has been re-affirmed and the IAEA Board of Governors has approved a number of specific measures that greatly increase IAEA access to information and to locations. Some of the new measures are being implemented under existing safeguards agreements. Other measures require new legal authority provided for in the Additional Protocol approved by the Board of Governors in May 1997.

This paper provides a summary of traditional safeguards and the limitations of that system, the conceptual development and associated measures that comprised Programme 93+2 and the Additional Protocol and concludes with a discussion of issues related to implementation.

Traditional Safeguards

International nuclear material safeguards consists of a complex control system based on material accountancy with the technical objective of providing for "... the timely detection of diversion of

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significant quantities of nuclear material from peaceful nuclear activities to the manufacture of nuclear weapons or of other nuclear explosive devices or for purposes unknown, and deterrence of such diversion by the risk of early detection" (para. 28, INFCIRC/153). Each non-nuclear weapon state (NNWS) party to the Nuclear Non-Proliferation Treaty (NPT) undertakes to accept IAEA safeguards on all nuclear material within the state's territory or under its jurisdiction or control. The basic procedural elements of the safeguards system are facility design review and verification, maintenance of facility operating records, reports on facility operations and on-site inspections (OSI). The system requires the concerted action of nuclear facility operators, state authorities and the IAEA inspectorate.

The safeguards system based on nuclear material accountancy is directly analogous, both in concept and in basic procedural elements, to a financial accounting system. The role of the inspectorate is analogous to that of the independent financial auditor. Both systems have the objective of building confidence. The financial audit is intended to build confidence in the public regarding the management of public institutions. The safeguards system builds confidence in the international community that states are complying with their non-proliferation commitments.

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Financial accounting is concerned with the collection of data describing the economic activities of a firm. These data are summarized in the form of financial statements. Auditing is the independent verification of the "fairness" (correctness) of the financial statements. The auditor collects data useful for verification from several sources and by different means. The acquisition of reliable audit information at minimum cost is a continuing aspect of the audit function.

Nuclear material accountancy records are maintained by facility operators for each facility under safeguards. Basically two kinds of reports — comparable to financial statements — are made by facility operators, through the cognizant state authorities, the State System of Accounting and Controls of nuclear material (SSAC), to the IAEA:

- The Inventory Change Report (ICR) gives details, for each nuclear material category, of all receipts (credits) and shipments (debits) of nuclear material.
- Periodically the facility operator performs a Physical Inventory Taking (PIT), which results in a detailed list, again for each nuclear material category, of the nuclear material that exists in the facility's inventory at a particular point in time.

These data provide the basis for the IAEA's independent verification activities in exactly the same sense that the financial statements of a firm provide the basis for the auditor's assessment of "fairness". The strategy for independent verification of inventory changes and for the verification of the periodic statement of inventory by a facility operator are central to nuclear material accountancy. The strategy depends primarily on the type and design of the particular facility and the type and quantities of nuclear material being handled at it. The time period between successive inventory statements is called a material balance period. The verified inventory statement at the end of one period becomes the beginning "book inventory" for the period that follows. In a manner exactly analogous to the closing of financial records for a specific fiscal period, a statement of inventory by a facility operator marks the closing of material accounts for a material balance period.

The intensity (i.e. the frequency and extent) of the IAEA's independent verification of inventory and inventory changes is determined by the values assigned to technical implementation parameters such as a significant quantity and timeliness ("timely detection"). The IAEA has defined a "significant quantity" as the amount of a particular material (e.g., plutonium) that a state would need to make

a nuclear explosive device. "Timeliness" is related to the estimated time needed to convert diverted material into the components of a nuclear explosive device. The uniform implementation of safeguards is maintained in all states with Comprehensive Safeguards Agreements (CSAs) through application of technical implementation criteria. These implementation criteria provide detailed requirements and procedures for how safeguards are to be implemented in any given circumstance. New technical measures for improved and more efficient safeguards are under constant development and the implementation criteria are revised as new technical measures become available. Each year the IAEA produces a Safeguards Implementation Report that is submitted to the Agency's Board of Governors. The report describes the implementation of safeguards in each facility and state. In 1997 the IAEA carried out 2,499 OSIs in 670 facilities throughout the world. The bulk of this effort was committed to safeguards in states with CSAs.

Limitations of Traditional Safeguards

Comprehensive or full-scope safeguards is to be applied to all nuclear material, once it has been processed to point suitable for enrichment or introduction into a reactor, in NNWS who have made a non-proliferation commitment (i.e., states parties to the NPT or one of the various regional agreements). Safeguards conclusions are based on an assessment that the material accountancy systems are in conformity with accepted accounting principles and that there has been no material mis-statement (through independent verification of nuclear material flows and inventories). However, as is the case with the financial auditor, the assurances provided by the safeguards system pertain to the correctness of information provided by the state and not to the completeness of that information.

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The issue of completeness is not new. It was debated at length by states' representatives negotiating the model CSA (i.e., the legal basis for comprehensive safeguards) twenty-five years ago. The resultant compromise was that the safeguards system would pertain only to nuclear material declared by the state with the tacit assumption that those declarations would be complete. During the twenty-five years of IAEA comprehensive safeguards, no diversion of material under safeguards or the subsequent utilization of diverted material has ever been detected. However, when a state accedes to the NPT and provides the IAEA with an initial report describing material and facilities, as required by the CSA, how can the IAEA be confident that the initial report is complete without extensive investigation of historical operating records and related data? Even a detailed investigation may not produce the desired results when historical records are incomplete or other information substantiating the initial report are not made available. This is a particularly difficult problem when a state is suspected of having produced unsafeguarded weapon-usable material prior to joining the NPT or some other agreement requiring comprehensive safeguards. Moreover, a complete initial report does not prevent a state from subsequently building secret facilities or secretly producing material. Inspector access under a CSA is limited under routine inspections to specified points in declared facilities (these points of access are called "strategic points" and they are identified as the access necessary for the IAEA to meet its material accountancy obligations for a particular facility). With this limited access the Agency's ability to detect an independent undeclared production cycle that makes no use of safeguarded material is circumscribed. This was essentially the situation that came to light in Iraq following the Gulf War.

The Conceptual Development

The conceptual framework for the evaluation of information for material accountancy safeguards was well established at the time INFCIRC/153 was negotiated. It evolved from a series of considerations that attempted to find a balance between what was needed to maintain technical rigour and independence on one hand and what was doable and affordable on the other. Basic to those considerations was the conclusion that a safeguards system based on any imaginable form of direct verification, whereby the verification authority would maintain parallel and independent records and accounts, was neither doable nor affordable. The analogy between the safeguards verification regime as an audit function directed at state/operator maintained records and accounts and the independent audit necessary to maintain public confidence in financial institutions follows directly.

In February 1992, the Board affirmed that the scope of comprehensive safeguards is not limited to nuclear material declared to the Agency by a state but that it also includes nuclear material subject to safeguards under the agreement which has not been declared. The requirement that the safeguards system provide assurances that state's material declarations are correct and complete is at the core of strengthened safeguards.

As before, there is no imaginable form of direct verification that states' nuclear material declarations are complete that is doable and affordable. However, the whole of a state's nuclear programme (present and future) involves an interrelated set of nuclear activities that imply (and are implied by) the existence of certain equipment, infrastructure, telltale traces in the environment and a predictable utilization of nuclear materials. This provides the basis for a conceptual development involving an expanded declaration, information evaluation, new technical measures and inspector access as integrated parts of an additional kind of audit function. An audit function intends, when implemented, to accumulate, indirectly, assurances that states' nuclear material declarations are complete by assuring the absence of activities that could indicate the presence of such material. And, as an audit function, everything that is done in the way of evaluation, verification and the seeking of additional information is in the context of a declaration.

Traditional material accountancy safeguards has developed through the definition of observables/indicators of diversion or of circumstances where the possibility of diversion cannot be excluded. These indicators are constantly tested against states' declarations of nuclear material inventories, flows and facility operations. Strengthened safeguards provides for a new kind of "observational vantage point" comprised of state declarations regarding nuclear and nuclear-related activities that constitute the whole of their nuclear programme and the utilization of nuclear material, increased inspector access, new technical measures and broadly based analysis of information. An important development in this regard is the so-called "Physical Model".

Nuclear material suitable for the manufacture of weapons does not exist in nature. It must be manufactured from source material through a series of discrete and definable steps (i.e., mining and milling, conversion, enrichment, fuel fabrication, irradiation, reprocessing, etc.). Each step can be accomplished through any one of several processes where the choice of process for a given step depends, to some extent, upon the processes chosen for both the preceding and succeeding steps. The Physical Model is an attempt to identify, describe and characterize every known process for carrying out each step necessary for the production of weapon-usable material. Thus, any possible route from source material to special fissionable materials is describable as some combination of processes identified and characterized in the Physical Model. Each process for carrying out a given

step is described and then characterized in terms of indicators of the existence of that process. The indicators of the existence of a process may be specialized and dual-use equipment, nuclear and non-nuclear materials, environmental signatures, requirements for specific technical skills and so on. The model was the combined work of department staff and a small group of experts from member states. It will always be a work-in-progress subject to periodic review and update but a form of closure was achieved recently with a Consultants' Meeting where each component was subjected to a detailed review by additional experts from ten member states.

Just as the overall technical objective of traditional safeguards translates to the testing of the hypothesis of "no diversion", the objective of strengthened safeguards is met through a country-level evaluation taken to be the testing of the hypothesis that "there are no undeclared nuclear activities". It is a detailed technical evaluation of the internal consistency of the state's declaration and a point-by-point comparison between indications of activities from all information available to the Agency and what the state says they are doing or they plan to do. The process of information evaluation and the inspection process are inextricably linked as many of the sub-hypotheses (or questions) regarding the absence of nuclear activities (including facility misuse) are, or only can be, tested through direct observation. Some hypotheses to be tested through direct observation are by design, others arise through the need to resolve inconsistencies between information collected by the Agency and a state's declaration. Information is relevant to this technical evaluation only to the extent that it indicates, directly or indirectly, the existence of a nuclear activity or the presence of nuclear material. The conclusion that there are no undeclared nuclear activities can only be inferred from the absence of any evidence to the contrary. This absence does not prove that there are no undeclared nuclear activities. It says that from all information available none such activity has been observed and, in the absence of such observation, there is no reason to reject the hypothesis.

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Programme 93+2 Measures

Detailed descriptions of the measures proposed under Programme 93+2, organized under the headings access to information, access to locations and the rational use of resources, are available in a number of places¹ and they will not be repeated here. A summary of the measures and the status of their implementation follows.

MEASURES APPROVED PRIOR TO MAY 1997

The process of strengthening and otherwise improving the safeguards system has been underway for some time. During 1991 the Board considered, and in 1992 confirmed, the right of the Agency to use special inspections as provided for in CSAs. In 1992 the Board took decisions regarding the early provision and use of design information and in February 1993 the Board endorsed a voluntary reporting scheme on imports and exports of nuclear material and exports of specified equipment and non-nuclear material.

Initial implementation of Programme 93+2 measures began in June 1995 when the Board agreed to the Director General's plan to proceed immediately with the implementation of those

measures deemed to be within the legal authority provided by existing CSAs. Measures being implemented under existing legal authority include additional information from states regarding facilities that once contained or will, in the future, contain nuclear material subject to safeguards, the expanded use of unannounced inspections, the collection of environmental samples at locations where inspectors now have access and the use of advanced technology to remotely monitor the movements of nuclear material.

Safeguards has always required concerted actions by the IAEA Inspectorate, state authorities and nuclear facility operators. The strengthened safeguards system places an even greater emphasis on cooperation. Increased cooperation has a number of dimensions. One dimension is a systematic evaluation, within the interest and capabilities of individual State (or Regional) SSACS, of ways to achieve efficiencies through enabling actions by the SSAC and through a sharing of resources. A SSAC questionnaire dealing with the legal basis and technical capabilities of SSAC was sent to fifty-nine states and two regional systems. The responses provide the basis for ongoing consultations toward increased cooperation while preserving the IAEA requirement to come to its own independent conclusion.

The early provision of design information is incorporated in all new and most existing Subsidiary Arrangements. The Voluntary Reporting Scheme now includes fifty-two states. A total of 1,827 reports on the production of source material or the export of pre-safeguards nuclear material intended for non-nuclear uses and 298 reports on the export of equipment and non-nuclear materials as specified in INFCIRC/254/Part 1, Rev. 2 have been received. Letters have been sent to states requesting information on nuclear fuel cycle operations, particularly those prior to the starting point of safeguards, and on certain closed down or decommissioned nuclear facilities which: (i) were built but where nuclear material was never introduced or (ii) where the facilities were closed down and the nuclear material removed prior to the entry into force of the CSA. Most states have responded to these requests.

Initial implementation of environmental sampling has focused on enrichment facilities and certain kinds of hot cells. The objective is to provide increased assurances of the absence of undeclared operations involving enrichments to levels higher than declared or of reprocessing. Baseline sample collections have been carried out in eight enrichment facilities in five states and thirty-nine hot cell complexes in twenty-six states. The results of baseline sample collections are discussed with the state and the operator when they are available to the Agency. The IAEA Clean Laboratory for Safeguards for the handling, screening, analysis and archiving of environmental samples was commissioned in December 1995 and was fully operational in July 1996. The Network of Analytical Laboratories has been extended to include laboratories with specialized capabilities for the analysis of environmental samples. The extended network now includes five laboratories in four states with more expected in the near future.²

The information available to the Agency through its traditional safeguards activities, augmented by additional information from states, results from environment sampling, information collected from open sources and information from databases available elsewhere in the Agency, is systematically evaluated for indications of nuclear activities in CSA states, which may not be known to the Agency.³ This process of broader information evaluation will be greatly strengthened with the additional information about a state's nuclear activities required under the Additional Protocol.

The Agency is preparing for increased utilization of unannounced routine inspections and the use of advanced technology to remotely monitor the movements of nuclear material through a series of demonstration field trials. Advanced technology in the form of digital surveillance cameras, electronic seals and other monitoring devices in conjunction with real time or near-real time transmission of data, appropriately authenticated and encrypted, to IAEA Headquarters is being

tested. The equipment is installed at locations in Switzerland, South Africa and the United States involving semi-static stores of direct-use material. The transmission of data is through both satellite systems and phone lines. The use of unannounced inspections for several applications is also being tested. The combination of remote monitoring and unannounced inspections provides the possibility of reduced inspection effort even within existing implementation criteria.

A basic tenet in meeting the requirement that the findings of the SSACs (e.g., nuclear material flows and inventories) are independently verified by the Agency is that the findings are reported to the Agency in a manner that, realistically, make them subject to verification. Historically, even though the reporting may have been within the terms of the agreement, the findings of the SSAC regarding nuclear material shipments and receipts and certain other safeguards events (e.g., movement of casks in a spent-fuel storage area) are often not reported to the Agency in a manner that makes the findings realistically subject to verification under circumstances short of continuous inspector presence. This has been the single biggest obstacle to the effective use of unannounced inspections, to the use of remote monitoring as a real verification tool (rather than simply the unattended collection of data) and to the "making full use" of the SSAC (para. 31, INFCIRC/153). The material accountancy reporting requirements contained in existing safeguards agreements are not directly addressed in the Additional Protocol. However, the voluntary provision of additional information on facility operations (Article 2.a.(ii), INFCIRC/540), Agency access to modern means of communication (Article 14, INFCIRC/540) and the requirement that states provide inspectors with multi-entry visas (Article 12, INFCIRC/540), were intended to provide the basis for improved nuclear transparency and for making full use of the SSAC through unannounced inspections and remote monitoring with resultant improvements in efficiency and effectiveness to the benefit of both the Agency and states. This was a primary objective of Programme 93+2.

Training courses dealing with the collection and handling of environmental samples, the Physical Model and enhanced observational skills are now part of the Department of Safeguards's regular training programme. Modules of the Introductory Course on Agency Safeguards for new inspectors are being added or modified to reflect the new implementation initiatives. Similar changes are being made in the training course for SSAC personnel. Other training courses dealing with information evaluation and design information verification at closed down facilities are under development.

MEASURES CONTAINED IN THE ADDITIONAL PROTOCOL

The Additional Protocol is comprised of a foreword, a preamble, seventeen operative articles, an article containing definitions and two annexes. The IAEA Board of Governors used the foreword to express their expectations as to how the provision of the Additional Protocol would apply to CSAs and to other agreements for the item or facility specific application of safeguards (i.e., Voluntary Offer Agreements with the NWS and the INFCIRC/66 Agreements with India, Pakistan and Israel). The Board indicated their expectations that:

- states with CSAs would accept all measures in the Additional Protocol without change in substance;
- NWS would accept those measures consistent with their obligations under Article 1 of the NPT; and
- the INFCIRC/66 states would accept those measures pursuant to safeguards effectiveness and efficiency objectives.

The preamble contains a general objectives statement and reiterates admonitions contained in

safeguards agreements that safeguards is to be implemented in a manner that does not hamper economic and technological development for peaceful uses; that respects health, safety and physical protection requirements and the rights of individuals; that any information coming to the Agency in the course of implementing safeguards be kept confidential; and that the frequency and intensity of Agency activities be kept to the minimum consistent with the objectives of strengthened, more efficient safeguards.

Measures provided for in the operative articles of the Additional Protocol approved by the IAEA Board of Governors on 15 May 1997 include:

- information about, and inspector access to, all aspects of states' nuclear fuel cycle, from uranium mines to nuclear waste and any other location where nuclear material intended for non-nuclear uses is present;
- information on, and short-notice inspector access to, all buildings on a nuclear site;
- information about, and inspection mechanisms for, fuel cycle related research and development;
- information on the manufacture and export of sensitive nuclear-related technologies and inspection mechanisms for manufacturing and import locations;
- the right of the state to "manage" the access of Agency's inspectors to prevent the dissemination of proliferation-sensitive information, to meet safety or physical protection requirements or to protect proprietary or commercially sensitive information as long as such arrangements do not preclude the Agency's meeting the objectives of strengthened safeguards;
- the collection of environmental samples beyond declared locations when deemed necessary by the IAEA; and
- administrative arrangements that (i) improve the process of designating inspectors, (ii) provide for the issuance of multi-entry visas (necessary for unannounced inspections), (iii) provide IAEA access to modern means of communications, (iv) provide for the possibility of subsidiary arrangements to the agreement that stipulate detailed procedures on how selected measures will be implemented, and (v) describe the requirements for entry into force.

The Additional Protocol in combination with the Safeguards Agreement provides for as complete a picture as practicable of a state's production and holdings of nuclear source material, the activities for further processing of nuclear material (for both nuclear and non-nuclear application), and of specified elements of the infrastructure that directly support the state's current or planned nuclear fuel cycle. The elements of the Reporting Scheme are incorporated in the Additional Protocol as legal obligations. Annexes 1 and 2 provide detailed specifications of the activities, equipment and non-nuclear materials to be reported on under Articles 2.a.(iv) and 2.a.(ix) respectively.

Increased access for inspectors is provided to help assure that undeclared nuclear activities are not concealed within declared nuclear sites or at other locations where nuclear material is present. Inspection mechanisms are also provided for instances where there appear to be inconsistencies between all information available to the Agency and the declaration made by states regarding the whole of their nuclear programme.

The collection of environmental samples is a new technical measure available to the Agency under existing Safeguards Agreements. The Additional Protocol greatly adds to the value of this measure through increased access for inspectors. In addition to the so-called location-specific application of environmental sampling, the Additional Protocol also provides for the future application of environmental sampling in a monitoring or wide-area mode. Procedures to implement wide-area environmental sampling require approval by the Board of Governors.

The Additional Protocol also contains measures that address three long-term administrative problems. States will be obliged to provide inspectors with multi-entry visas covering at least a period of one year and to accept simplified inspector designation procedures whereby an inspector approved by the Board is automatically designated to a state party to the Additional Protocol unless the state objects within three months of the Board's action. Further, the Agency is assured of access to modern means of communication (i.e., satellite) existing in a state or, if satisfactory means do not exist, the state is obliged to consult with the Agency regarding other ways to meet Agency communication needs.

The relationship between the Additional Protocol and the Safeguards Agreement is specified in Article 1. The Safeguards Agreement and the Additional Protocol are to be read as a single document with, in cases of conflict, the provisions of the Additional Protocol prevailing. States' concerns regarding the confidentiality of sensitive information to be provided to the Agency under the Additional Protocol were addressed through requirements that the Agency maintain a stringent regime for the protection of such information and that the regime be periodically reviewed and approved by the Board of Governors.

Implementation Issues — How Far, How Fast?

At this juncture, it is not possible to predict how rapidly the Additional Protocol will come into force but initial indications are positive. At the conclusion of the Board of Governors' December 1998 meeting, thirty-eight states had signed Additional Protocols that had been submitted and approved by the Board. This includes Canada, China, Japan, the United States and the fifteen states comprising the European Union (one agreement covering the thirteen NNWS of the Union and separate ones for France and the United Kingdom). The Additional Protocols to the CSAs with Australia, the Holy See, Jordan, New Zealand and Uzbekistan have entered into force. Canada and Japan expect that their Additional Protocols will enter into force before the end of 1999. Meeting entry into force requirements for the states of the European Union and the United States may prove to be a lengthy process. A number of other states, including the remaining NWS — the Russian Federation — have initiated discussions with the IAEA Secretariat pursuant to their Additional Protocols.

Programme 93+2 was designed for states with CSAs with the IAEA. However, it was acknowledged early in the programme that the implementation of certain measures in other states (i.e., the NWS and the INFCIRC/66 states) could both enhance the effectiveness of programme implementation in CSA states and improve the effectiveness and efficiency of the safeguards that are implemented in these other states. This so-called "universality" issue was a central feature in the negotiation of the Additional Protocol. Each of the NWS indicated which of the measures contained in the Additional Protocol they are prepared to accept during the 15 May 1997 meeting of the Board. Both the Board and the open-ended committee of the Board that negotiated the Protocol expressed their expectation that adoption of the Additional Protocol in CSA states (the Additional Protocol in its entirety) and in non-comprehensive safeguards states (selected measures) would maintain a certain "parallelism". Several CSA states indicated that evidence of action toward adopting the Additional Protocol in other states would be necessary to obtain approval of the Additional Protocol in their parliaments.

Another significant implementation issue relates to the application of the Additional Protocol in the large number of states with a CSA that includes the Small Quantities Protocol (this suspends the implementation of a significant portion of Part 2 of INFCIR/153 based on the state's declaration

that it possesses no or little nuclear material subject to safeguards). In principle, the Additional Protocol applies to these states and a large educational effort will be required as a basis for their action in this regard (112 states have, or are expected to have, a Small Quantities Protocol as part of their CSA with the Agency).

Preparations by the IAEA Secretariat to implement the Additional Protocol involve the development of a whole new infrastructure. In the near term, this includes:

- guidelines and format for preparation and submission of declarations pursuant to Article 2 of the Additional Protocol for states with and without a Small Quantities Protocol;
- negotiation arrangements, the development of model language that anticipates the need to incorporate certain measures in subsidiary arrangements and the development of model language for required communications to states;
- the technical basis and guidelines for complementary access; and
- the development of detailed internal procedures for the conduct of activities associated with technical measures specified in the Additional Protocol.

An initial version of the guidelines for the Article 2 declarations was distributed to states in early September 1997. Much of the other work was planned for completion by the end of 1998. Evolution of the safeguards implementation criteria that provides for a full integration of the new measures with elements of the traditional system will take time and experience; however, the ingredients are now in hand for a greatly strengthened and more efficient safeguards system. Finally, the Additional Protocol, which provides the legal basis for the most intrusive multilateral verification regime in history, provides strong testimony to the political commitment of IAEA member states to preventing a repeat of the kind of situation uncovered in Iraq following the Gulf War.

Notes

- ¹ R. Hooper, Strengthening IAEA Safeguards in an Era of Nuclear Cooperation, *Arms Control Today*, November 1995, p. 15; B. Pellaud, *Safeguards and the Nuclear Industry*, Core Issues, no. 5, The Uranium Institute, London, 1996.
- ² J. Cooley, E. Kuhn and D. Donohue, *The IAEA Environmental Sampling Programme*, IAEA Symposium on International Safeguards, IAEA-SM-351/182, Vienna, October 1997.
- ³ A. Nilsson et al., *Evaluating Information — Key Function of the New Safeguards System*, IAEA Symposium on International Safeguards, IAEA-SM-351/122, Vienna, October 1997.