

**REVIEW OF THE NEGOTIATION
OF THE
MODEL PROTOCOL
ADDITIONAL
TO THE AGREEMENT(S)
BETWEEN STATE(S)
AND THE
INTERNATIONAL
ATOMIC ENERGY AGENCY
FOR THE
APPLICATION OF SAFEGUARDS**

INFCIRC/540 (Corrected)

VOLUME I/III

SETTING THE STAGE: 1991-1996

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VOLUME I. SETTING THE STAGE: 1991-1996

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VOLUME I. SETTING THE STAGE: 1991-1996

EXECUTIVE SUMMARY

Events in Iraq at the beginning of the 1990s demonstrated that the safeguards system of the International Atomic Energy Agency (IAEA) needed to be improved. It had failed, after all, to detect Iraq's clandestine nuclear weapon program even though some of Iraq's activities had been pursued at inspected facilities in buildings adjacent to ones being inspected by the IAEA. Although there were aspects of the implementation of safeguards where the IAEA needed to improve, the primary limitations were considered to be part of the safeguards system itself.

That system was based on the Nuclear Nonproliferation Treaty of 1970, to which Iraq was a party, and implemented on the basis of a model NPT safeguards agreement, published by the IAEA 1972 as INFCIRC/153 (corrected). The agreement calls for states to accept and for the IAEA to apply safeguards to all nuclear material in the state. Iraq was a party to such an agreement, but it violated the agreement by concealing nuclear material and other nuclear activities from the IAEA. Although the IAEA was inspecting in Iraq, it was hindered by aspects of the agreement that essentially limited its access to points in declared facilities and provided the IAEA with little information about nuclear activities anywhere else in Iraq.

As a result, a major review of the NPT safeguards system was initiated by its Director General and Member States with the objective of finding the best means to enable the IAEA to detect both diversions from declared stocks and any undeclared nuclear material or activities in the state. Significant improvements that could be made within existing legal authority were taken quickly, most importantly a change in 1992 in how and when and what design information would be reported to the IAEA. During 1991-1996, the IAEA pursued intensive study, legal and technical analysis, and field trials and held numerous consultations with Member States. The Board of Governors discussed the issue of strengthening safeguards at almost all of its meeting.

In 1996, the IAEA drafted a Model Additional Protocol, which together with NPT safeguards agreements, was designed to give the Agency the capability to strengthen the IAEA's ability to detect undeclared nuclear material and activities. The IAEA Board of Governors submitted this draft to Committee 24, which was established by the Board to review the IAEA draft and make changes that would result in a new Model Additional Protocol that would be acceptable to all. The Committee began in July, 1996 and completed its work in April, 1997. The Board of Governors approved the new Model Additional Protocol in May, 1997. By doing so, the Board also approved the use of a powerful new safeguards tool, environmental sampling at places other than facilities.

As of March, 2009, 85 non-nuclear weapon states had adopted an Additional Protocol. Algeria, Argentina, Brazil, Egypt, Iran, and Mexico were the only NPT non-nuclear

weapon states with more than one facility that had not. The five NPT NWS have Additional Protocols in force, and the Board of Governors had approved one for India. Israel and Pakistan had not yet taken action on an Additional Protocol.

Where an additional protocol is in force, it significantly strengthens the ability of the IAEA to detect undeclared nuclear material or activities. It is especially strong at facilities and their sites, where the IAEA has access to all points on the site and to all the buildings there. It provides the IAEA with a wealth of information about states' nuclear fuel cycles and their future nuclear fuel cycle plans. And the IAEA is able to seek and obtain access to nuclear fuel cycle related activities whenever it has a question or detects an inconsistency in the information provided by the IAEA. The same ground rule applies for access anywhere in a State.

Together with the collection of publicly available information and information provided by Members States, the IAEA is now able to make State level evaluations and draw meaningful conclusions about the absence of undeclared nuclear material and activities where it is able to implement an Additional Protocol.

A review of the discussions from 1991-1995 and the negotiations of Committee 24 have identified elements that permitted the negotiations to be concluded successfully:

- U.S. leadership and its ability to obtain support from the highest level of the U.S. Government was essential;
- Consistent engagement by the Director General and strong technical support from the Secretariat of the IAEA was a necessary underpinning;
- It was critical that States more heavily influenced by a strong interest in reducing the costs and impact of safeguards on industry and States more heavily influenced by the desire to strengthen the hand of the IAEA were willing and able to find common ground;
- The Model Additional Protocol could not have been approved without the expressed willingness of the NPT nuclear-weapon states to accept measures of the Model Protocol, ranging from the U.S., which accepted all measures, to China and Russia, who accepted only measures relevant to links with NNWS.
- External factors also contributed, including:
 - Shared concerns among Member States about proliferation in Iraq and Iraq's inability to influence IAEA deliberations as a result of its defeat in war;
 - Nonproliferation concerns about the DPRK;
 - Positive trend in nonproliferation, including South Africa joining the NPT in 1991; China and France joining in 1992; and Argentina and Brazil taking steps toward creating ABACC.

Of course, finding common ground was possible only by taking steps to reduce impact and to reduce costs. This might be seen most clearly in outcomes concerning which non-nuclear material and equipment were to be specified for reporting in Annex I, "manufacture"; or Annex II, "export." With respect to manufacture, Annex I is focused on trigger list items related to enrichment (about half the list reflecting the many different

enrichment technologies), six more related to reprocessing, reactors, and fuel fabrication; and two more, hot cells and shipping flasks; and the reporting unit is “scale of operations.” The export list in Annex II consists of just the items adopted by the Board for voluntary reporting in 1993, which was the then extant NSG trigger list consisting of equipment and other items especially designed or prepared for nuclear use. Neither list contains any dual-use items related to the fuel cycle or to weaponization. For export, where the IAEA had once proposed reporting and verification of imports and exports, the Model Protocol requires reporting only of exports and there is no systematic verification.

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VOLUME I. SETTING THE STAGE: 1991-1996

FOREWORD

The Nuclear Nonproliferation Treaty (NPT) plays a fundamental role in international efforts to prevent the proliferation of nuclear weapons. Under the NPT, the 186 non-nuclear-weapon States (NNWS) parties are obligated to conclude a safeguards agreement with the International Atomic Energy Agency (IAEA) that gives the IAEA both the right and the obligation to apply its safeguards to all nuclear material in all peaceful nuclear activities in the State, so-called comprehensive safeguards agreements.

The objective of these comprehensive safeguards agreements is to enable the IAEA to achieve the timely detection of the diversion of significant quantities of nuclear material from peaceful nuclear activities to the manufacture of nuclear weapons. These safeguards are intended to deter such diversion by the risk of early detection. By serving in this capacity as a “nuclear watch dog,” the IAEA plays a central role in promoting nuclear nonproliferation. At the same time, confidence in these safeguards helps to promote peaceful nuclear cooperation.

Comprehensive NPT safeguards agreements are all based on a model agreement, *The Structure and Content of Agreements between the Agency and States required in connection with the Treaty on the Non-proliferation of Nuclear Weapons*, which were negotiated shortly after the Treaty entered into force in 1970. This model is commonly known as INFCIRC/153¹, which is shorthand for the IAEA designation of Information Circular 153, these circulars being one of the ways in which the IAEA communicates with its Members States. As of March 2009, 159 States had concluded such agreements with the IAEA.

The implementation of IAEA safeguards under the model safeguards agreement, INFCIRC/153, has proven to be effective in deterring diversions of nuclear material from declared stocks. However, events in the early 1990s, especially in Iraq, demonstrated that the structure of the agreement and its implementation did not provide the IAEA with the tools necessary to build confidence that its safeguards were being applied to **all** nuclear material in a State. In fact, a nuclear weapon program was discovered in Iraq in 1991 that had not been detected by the IAEA despite the implementation there of a comprehensive INFCIRC/153 safeguards agreement.

¹ The official version is INFCIRC/153 (Corrected) printed in June 1972.

In light of this, an intensive review of the NPT safeguards system was initiated in 1991, and between 1996 and 1997, the Member States of the IAEA negotiated and reached agreement on a new safeguards agreement entitled *Model Additional Protocol Additional to the Agreement(s) between State(s) and the International Atomic Energy Agency for the Application of Safeguards (INFCIRC/540)*². This agreement represents a significant improvement in the international safeguards system.

The agreement on the Model Additional Protocol (Additional Protocol) is a major milestone in strengthening the international nuclear nonproliferation regime. In particular, when accepted by states, it provides the IAEA with new authorities and significantly increases the Agency's access to information and locations. Where the IAEA had previously been provided with information related to the flow and inventory of nuclear material, it now would receive information about a broad range of states' nuclear fuel cycle activities.³ Where it had previously focused on verifying that nuclear material was not diverted from declared stocks, it was now encouraged and empowered to confirm that states were not engaged in clandestine nuclear activities anywhere in the State, and its ability to obtain access to locations in the State was both enhanced and simplified.

As of March 2009, 90 NPT states parties had concluded Additional Protocols. An additional 36 NPT states parties had an Additional Protocol that had been signed or approved by the Board of Governors, but not yet brought into force. Algeria, Argentina, Brazil, Egypt, Iran, and Mexico were the only NPT non-nuclear weapon states with more than one facility that had not. The five NPT NWS have Additional Protocols in force, and the Board of Governors had approved one for India. Israel and Pakistan had not yet taken action on an Additional Protocol.

The formal negotiation of the Model Additional Protocol took place at the headquarters of the IAEA in Vienna, Austria. It was conducted in a committee established for this purpose by the Board of Governors of the IAEA that became known as Committee 24. (The committee was the 24th one created by the Board.) The Board of Governors established the committee as an open-ended committee so that all Member States of the IAEA could participate; selected the Chair of the committee; and instructed it to use as the basis for its discussions a draft protocol that had been submitted to the Board by the IAEA Secretariat in June 1996.

Committee 24 met for the first time in July 1996. It completed its work when it adopted the Model Additional Protocol in its final session in April 1997. The Model Additional Protocol was, in turn, approved by the IAEA Board of Governors in May 1997. That this major agreement could be negotiated in such a short time was a result of an intensive

² The official version is INFCIRC/540 (Corrected) printed in September 1997. This agreement is often referred to as the Model Additional Protocol.

³ The nuclear fuel cycle is a system of nuclear installations typically interconnected by flows of nuclear material. Such a system may include: uranium and thorium mines, ore processing plants, conversion plants, enrichment plants, fuel fabrication plants, reactors, spent fuel storages, reprocessing plants, associated storage, and treatment, and storage of wastes containing nuclear material.

review of the IAEA's safeguards system conducted during the five years preceding the formal negotiations in Committee 24.

This report examines the origins and evolution of the Model Additional Protocol. It traces the IAEA's efforts in the early to mid-1990s to strengthen and expand existing IAEA safeguards. These had focused primarily on verifying that non-nuclear-weapon states-parties to the NPT had not diverted nuclear material from declared stockpiles. Now, the Member States of the IAEA also wanted the Agency to be able to provide assurances that there were no clandestine nuclear activities in a State.

This report addresses separately, in Volume I, the period from 1991-1996, before the formal negotiation of the Model Additional Protocol began; and in Volume II, the formal negotiation itself, which was conducted from late 1996 to mid-1997. It reconstructs the development of the key safeguards strengthening measures proposed and considered by the IAEA Secretariat, Member States, and the Board of Governors, and it identifies issues that emerged during this five-year period and how these concerns impacted the negotiations and the final version of the Additional Protocol.

The report aims to offer insights into the intentions and interpretations of those involved in the negotiating process and to illuminate how participants arrived at the final document, with a view to find ways to take advantage of future opportunities to strengthen the international safeguards system. The report might also serve as a reference document for both the Agency and States in terms of interpreting and applying the text of the Additional Protocol.

The report is divided into three volumes. Volume I covers the period from 1991-1996, the period that set the stage for the negotiation of the Model Additional Protocol. It describes:

- the safeguards system that had emerged under the NPT starting in 1970
- challenges to the NPT safeguards system;
- safeguards areas that the Agency sought to strengthen;
- key players in the debate; and
- Board of Governors meetings where most of the influential discussions took place prior to the establishment of Committee 24.

Volume II provides an analysis of the primary issues of concern to Member States that emerged during the 1996-1997 negotiations in Committee 24. These were:

- Need for additional legal authority
- The purpose of the Additional Protocol
- Universality-- To what states is the Additional Protocol relevant
- The relationship between the Additional Protocol and INFCIRC/153
- Constitutional and legal limitations
- Purpose of complementary access
- Scope of access during complementary visits
- Advanced notice of inspections

- Managed access rights
- Informing states of the results of implementation of the protocol
- Protection of safeguards information
- Reporting production of specified equipment and non-nuclear material
- Reporting imports and exports of dual-use items

Volume III contains a detailed chronological development of each Article of the Model Additional Protocol.

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VOLUME I. SETTING THE STAGE 1991-1996

I. INTRODUCTION

The Model Additional Protocol was negotiated with the intention to strengthen the safeguards system of the NPT. Thus, it is “Additional” to the NPT safeguards system and to INFCIRC/153 safeguards agreements. Nonetheless, as will be seen later, there was a strong impetus during the negotiation to ensure that all states were willing to accept new commitments under the Model Additional Protocol. In order to set the stage for the formal negotiation of the Model Additional Protocol, the following sections describe the safeguards system that the Model Additional Protocol was intended to strengthen.

***1. IMPLEMENTATION OF COMPREHENSIVE SAFEGUARDS UNDER THE
NUCLEAR NONPROLIFERATION TREATY***

The Nuclear Nonproliferation Treaty was opened for signature in 1968 and entered into force in 1970. It requires each non-nuclear-weapon state (NNWS) party to negotiate and conclude with the IAEA an agreement to accept the application of Agency safeguards to all source or special fissionable material in all of its peaceful nuclear activities. The Treaty specifies that a state’s NPT safeguards agreement should be “in accordance with” the IAEA Statute and the Agency’s safeguards system, but when the Treaty entered into force in 1970, it remained for the IAEA to work out a detailed model for these new safeguards agreements, which are commonly called comprehensive safeguards in light of their applicability to all nuclear material in a State.

To accomplish this, the Board of Governors established in 1970 an open-ended committee of IAEA member States (called “Committee 22”) to develop and negotiate the structure and content of the model to be used for NPT safeguards agreements. After an extensive series of meetings from June 1970 through March 1971, the Board of Governors in April 1971 approved by consensus a model text. The document, entitled *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 published as Information Circular 153 (INFCIRC/153) and is commonly referred to by this abbreviated term. INFCIRC/153 became the basis for all NPT safeguards agreements negotiated with individual NPT NNWS Parties.

In light of the fact that acquisition of the nuclear material needed to manufacture nuclear weapons was considered to be the primary hurdle to acquiring them, the negotiators of INFCIRC/153 focused on devising means to verify nuclear material holdings and to detect diversions from them in a timely manner.

2. CONTENT AND LIMITATIONS OF INFCIRC/153⁴

INFCIRC/153 is divided into two parts: Part I (Paragraphs 1 – 25) covers general matters such as the basic undertaking, the scope of safeguards, cooperation between the IAEA and the State, establishment of a state system of accounting and control for nuclear material (SSAC), privileges and immunities of inspectors, and reporting of non-compliance. Part II (Paragraphs 26-97) describes the technical and procedural aspects of the verification measures to be carried out in order to implement safeguards and to permit the IAEA to accomplish its objective, i.e., “the timely detection of the diversion of significant quantities of nuclear material from peaceful nuclear activities to the manufacture of nuclear weapons or other nuclear explosive devices or for purposes unknown, and the deterrence of such diversion by the risk of early detection” (Paragraph 28).

INFCIRC/153 provides the IAEA with a robust capability to accomplish the objective of detecting diversion of nuclear material from stocks declared by a state as well as the nuclear material produced at facilities identified by States to the IAEA. As a consequence of this robustness, there have been no significant diversions of nuclear material under an NPT safeguards agreement. Nonetheless, events prior to 1991 revealed that there were shortcomings in the NPT safeguards system as it was applied prior to then. These relate to the ability of the IAEA to implement its obligation to apply safeguards to all nuclear material in all peaceful nuclear activities in a State, not just to the nuclear material declared by a State. (This distinction is often characterized as ensuring that States’ declarations are both correct (everything declared is accounted for) and complete (there are no undeclared nuclear material or activities).

Some limitations are attributable to the structure of INFCIRC/153 itself. However, others stemmed from how provisions of INFCIRC/153 were implemented in practice. INFCIRC/153 necessarily was the product of compromises made among Member States with different views regarding the proper intensity and intrusiveness of NPT safeguards. Inevitably, such compromises left gaps in the model text. The same factors that led to these compromises sometimes led later to practices that fell short of what might otherwise have been implemented even within the framework of INFCIRC/153.

For example, one of the primary vulnerabilities of the NPT safeguards system that was revealed after Iraq’s clandestine program was brought to light was that the IAEA focused almost all its safeguards attention on verifying the non-diversion of declared nuclear material (correctness) while remaining essentially inattentive to the possibility of undeclared nuclear material and activities (completeness). This inattention is attributable both to the text of INFCIRC/153 and to the way it was implemented.

⁴ The full text of INFCIRC/153 is available on the internet at:
<http://www.iaea.org/Publications/Documents/Infcircs/Others/infcirc153.pdf>

The basic undertakings of INFCIRC/153 cover both correctness and completeness. Indeed, its first two paragraphs make clear, in accordance with NPT Article III, that each NNWS undertakes to accept safeguards on *all* source or special fissionable material in *all* its peaceful nuclear activities, and that the IAEA has both the right and obligation to ensure that safeguards are applied on *all* source or special fissionable material in *all* peaceful nuclear activities. Yet however broad is the explicit mandate of Paragraphs 1 and 2, other aspects of the structure of the agreement and the actual safeguards procedures specified in Part II of INFCIRC/153 limited the IAEA's ability to detect indications of undeclared nuclear material or activities at both declared and undeclared locations, especially at the latter.

For example, access of the inspector is normally limited to facilities and locations declared by States. When safeguards are implemented on a routine basis, the access of the IAEA inspector within facilities is constrained to strategic points, that is, the locations negotiated with the State that are considered to be necessary and sufficient for the IAEA to accomplish its objectives.

The IAEA did have the authority (Paragraph 73) to request special inspections involving access to information or locations beyond that specified for routine and ad hoc inspections. These arise in circumstances where the IAEA considers that the information available to it normally is "not adequate for it to fulfill its responsibilities" under the safeguards agreement. In circumstances where the Board may judge an action by a State to be "essential and urgent" in order to ensure that nuclear material subject to safeguards is not diverted, a state can be required to accept a special inspection without delay and, should the state fail to cooperate, this non-cooperation could be reported to the Security Council (Paragraphs 77, 18, and 19). Aside from these tools, which came to be thought of as confrontational and only to be pursued if the Director General was in a position to present a compelling case to the Board of Governors; inspectors had no ready access to locations other than key measurement points or other agreed strategic points at declared facilities.

The drafters of INFCIRC/153 for both practical and strategic reasons had to select a starting point for the application of safeguards. Thus, another way in which Part II of INFCIRC/153 falls short in addressing *all* nuclear material is that safeguards measures are not applied to nuclear material in the early stages of the nuclear fuel cycle, i.e., the stages that precede the "starting point of safeguards" established in paragraph 34(c). Similarly, INFCIRC/153 does not afford the IAEA information about, or access to, nuclear material in the form of intermediate or high-level waste on which safeguards have been terminated (Paragraph 11) and nuclear material that has been exempted for research with small quantities (Paragraph 37) or for non-nuclear use (Paragraph 36(b)).

Some limitations of this sort were essential in 1970 in order to create a coherent system that was affordable, technically sound, and that focused resources on the nuclear material of greatest significance. Nonetheless, as the technologies of uranium enrichment and plutonium processing became less costly and more accessible, the technical basis for some of the choices made then became less sound.

As will be seen later, the IAEA's experience in Iraq showed the important role that material containing uranium that is not of a "composition and purity suitable for fuel fabrication or for being isotopically enriched" could play in supporting a clandestine nuclear program.⁵ Iraq and other cases highlighted that R&D involving even small quantities of nuclear material can be an important indicator of sensitive undeclared nuclear activities. Correcting these limitations by giving the IAEA information about and access to nuclear material throughout the fuel cycle, from mines to waste sites as well as to exempted nuclear material, was to become one of the important features of the Additional Protocol.

With respect to deterring diversion of declared nuclear materials, the IAEA approach developed into using specific, deterministic procedures and measures designed to achieve timely detection of the diversion of a significant quantity of nuclear material. But for undeclared nuclear activities, about which the state has reported no information or which may not involve nuclear material, the challenge of detection is much greater and could benefit from trying to detect clandestine programs at an early stage of development.

Sensitive nuclear material production processes usually are the product of research and development efforts that often include substantial R&D not involving nuclear material. For example, the deployment of an operational gas-centrifuge capability normally would be preceded by extensive efforts in rotor fabrication and mechanical testing before nuclear material was used. And once a clandestine cascade is operating with nuclear material, it likely would be supported by facilities that manufactured and assembled centrifuges, specialized electrical equipment, and header piping; facilities that potentially could represent important, compelling indicators of the production of, or the intent to produce, undeclared nuclear material. Under INFCIRC/153, the practice developed that states did not have to provide the IAEA with information about, or access to, nuclear fuel cycle activities that do not involve nuclear material until very close to the time when nuclear material was to be first introduced. Addressing this limitation would be another key theme of the Additional Protocol.

Another limitation of INFCIRC/153 is that, other than transfers of nuclear material, it lacks a system of reporting on imports or exports of anything else used in the nuclear fuel cycle. INFCIRC/153 requires states to report international transfers of nuclear material, but it does not provide for reporting of exports and imports of equipment or non-nuclear material. Under Article III.2 of the NPT, states parties undertake not to export to NNWS any equipment or material especially designed or prepared ("EDP") for the processing, use or production of special fissionable material unless the fissionable material will be subject to the safeguards required by Article III. In the case of an EDP item exported to an NPT NNWS party, the exporting state would presume that recipient state, by virtue of its Article III.1 obligation to accept safeguards on all its peaceful nuclear activities,

⁵ The phrase in quotes is from Para. 34.(c) in INFCIRC/153. Such material (i.e., pre-34.(c) material) is subject to reporting requirements upon import or export. Nuclear material that meets the 34.(c) definition of composition and purity is subject to the other procedures specified in INFCIRC/153.

would use the item only in a safeguarded activity, and so there appeared to be no need to report such exports of equipment and non-nuclear material the IAEA.

Iraq made extensive use of imported EDP items in its uranium conversion, gas-centrifuge uranium enrichment, and other undeclared nuclear activities, highlighting the reality that such items could play a key role in clandestine programs and that reporting international transfers to the IAEA would have safeguards value. It also demonstrated that export information, which provides information from one state about another state's activities, could be valuable in providing indications of undeclared nuclear activities.

INFCIRC/153 also allows a lag in the time required to provide the Agency with nuclear facility design information, a lag that could be exploited to construct a "legally" unreported nuclear facility of significance. INFCIRC/153 indicates that the time limits for providing the IAEA design information concerning new nuclear facilities will be specified in the Subsidiary Arrangements. Subsidiary Arrangements add detail to the implementation of safeguards that is not contained in INFCIRC/153. The portion governing submission of design information is known as Code 3.12. Until 1992, the standard language for Code 3.12 called for the state to provide the IAEA with completed design information questionnaires for new nuclear facilities as soon as possible but no later than 180 days before the introduction of nuclear material. This time frame was considered sufficient for the IAEA to verify the design information and plan a safeguards approach for the facility.⁶

However, this also created a safeguards gap in that a state intent on constructing a nuclear facility that it never intended to declare to the IAEA could be very far along on the project, could even have completed the facility without having notified the IAEA or provided design information, and still be in compliance with its safeguards agreement. Even in cases where states did intend to declare a facility to the IAEA, facilities only 30-180 days from introduction of nuclear material often would be too far along in construction for inspectors to verify design details that are readily observable only at earlier stages of construction. Indeed, the Secretariat told the Board in 1991 (GOV/2554) that, "Experience has demonstrated that [the 30-180 day advance notice] is not sufficient and that much earlier notification to the Agency is needed both to enhance knowledge and to reinforce confidence."

In principle, the Agency had a right to verify initial design information and then to periodically re-verify it even after a facility became operational in order to confirm that the design had not changed in a way that would compromise safeguards implementation. These rights flow from INFCIRC/153 and were emphasized by the IAEA in GOV/2554 in 1991, which stated that under comprehensive safeguards agreements, "the Agency's authority to verify design information is a continuing right which does not expire when a facility goes into operation. Nor does this continuing right expire with the closing down of a facility." In practice, however, re-verification of design information was rarely performed.

⁶ Note that while the time frame might be sufficient, there is no fixed reporting time since that depends on a state's decision about when to introduce nuclear material.

The Agency had some means at its disposal to detect undeclared activities. For example, in addition to inspection activities under INFCIRC/153, the IAEA could collect and analyze short-range environmental samples, a powerful tool for detecting undeclared nuclear activities at the sites of declared nuclear facilities. Environmental sampling was only introduced in the 1990s, and used on a voluntary basis, but it was later formally proposed by the IAEA as one of the technical, safeguards strengthening measures. In 1995, the Board accepted its use when it noted the intention of the Director General to use environmental sampling at any location to which the IAEA had access during ad hoc, routine, or special inspections or during visits to verify design information.

The IAEA could also collect and analyze open-source information and third-party information to systematically assess states' nuclear programs and look for indications of undeclared nuclear activities. An important instance of this was the use of non-IAEA information in connection with the request for a special inspection in the DPRK in 1993. It is notable because the Board of Governors accepted both its receipt by the Agency and its use, but the IAEA did not systematically review open-source information. .

Part of the reason was, perhaps, a tacit assumption that in the rare event a state deliberately failed to report all its nuclear material or pursued undeclared nuclear activities in violation of its NPT safeguards obligations, member-state intelligence services would detect them and come forward to provide the IAEA with location-specific evidence. While the first part of the assumption may be valid, Member States did not provide the Agency with such evidence, even in the year before the 1991 Gulf War when states were tracking and interdicting clandestine procurement efforts by Iraq's secret gas-centrifuge program. Part of the reason might have been that this evidence would not have identified suspect locations in Iraq and, therefore, could not have served as a basis for action by the IAEA.

II. CHALLENGES TO THE NPT SAFEGUARDS SYSTEM

1. INTRODUCTION

Significant events occurred in Iraq and North Korea in the early 1990s that presented challenges to the system of comprehensive IAEA safeguards that had been set up in the 1970s to implement Article III of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT). Both involved clandestine nuclear activities. Events in Iraq demonstrated that the INFCIRC/153 safeguards system needed to be strengthened, and they provided the impetus for the negotiation of a new safeguards arrangement that resulted in 1997 in the Model Additional Protocol. Events in North Korea contributed to the sense of urgency and importance of strengthening the safeguards system.

In addition, the decision by South Africa to abandon and dismantle its nuclear weapon program, join the NPT, and adopt a comprehensive safeguards agreement posed new challenges for the IAEA. One was to verify the validity of South Africa's initial declaration of its nuclear material holdings. This created an opportunity for the IAEA to

understand, working in a cooperative environment, what was needed to address both correctness and completeness. In addition, the IAEA was asked to review the dismantlement of South Africa's nuclear weapon program. This section reviews the Iraq, North Korea, and South Africa cases. Each of them were key factors in initiating and/or shaping the effort to draft and negotiate the Model Additional Protocol.

2. IRAQ

After the 1991 Gulf War, operating in Iraq under greatly expanded rights conferred on it by UN Security Council Resolution 687 (UNSCR 687), the IAEA found evidence there of an extensive clandestine nuclear weapon program. The program included efforts to produce high-enriched uranium for nuclear weapons by the electromagnetic isotope separation (EMIS) method, the gas-centrifuge method, and by other techniques. It also found evidence of an effort to design and construct nuclear weapons. The program had escaped IAEA detection for years, despite its verification activities under Iraq's Comprehensive Safeguards Agreement and the presence of IAEA inspectors at some of the facilities involved.

The IAEA's activities in Iraq in the post-Gulf-War period were conducted outside the NPT and IAEA safeguards framework. Nevertheless, they had profound implications for the NPT safeguards system: Iraq was the first instance where a violation of a safeguards agreement was reported to the UN Security Council. It shook the IAEA and its Member States out of a complacently narrow view that the safeguards system need concern itself only with declared nuclear material at declared nuclear facilities. It also taught several lessons about the limitations of INFCIRC/153 and suggested ways to close them.

2.1. Access

The Iraq case clearly showed how a state could exploit the fact that, at sites of declared nuclear facilities, the Agency had no routine access other than in the declared element (and even then no routine access other than strategic points). At the Al Tuwaitha nuclear research center, site of Iraq's three declared nuclear facilities (two research reactors and a fuel fabrication laboratory), the UNSCR 687 inspections revealed that a broad range of undeclared nuclear activities had been conducted at locations throughout the site that had never been declared by Iraq or visited by IAEA inspectors. These clandestine activities included: separation of plutonium from unreported irradiation of uranium targets; conversion of uranium oxide to U-metal, UF₄, UF₆, and UCl₄; fabrication, testing, and operation of electromagnetic isotope separation (EMIS) equipment and recovery of EMIS-enriched uranium; chemical enrichment research; neutron initiator development; and other activities.⁷ The extent to which unsafeguarded locations were used to support the clandestine nuclear program is illustrated Figure 1.

⁷ Annex 1 of the "Fourth consolidated report of the Director General of the International Atomic Energy Agency under paragraph 16 of Security Council resolution 1051 (1996)," S/1997/779, 8 October 1997.

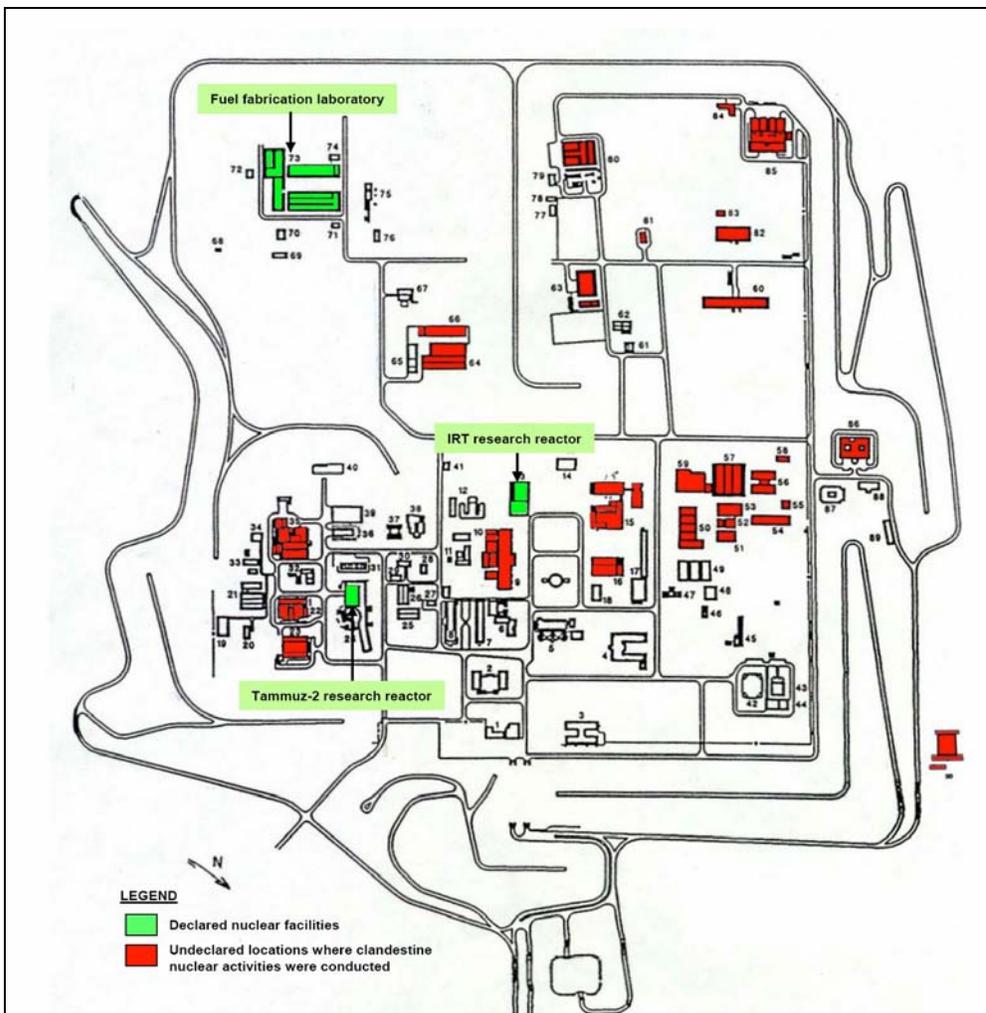


Fig. 1, In this schematic drawing of the Tuwaitha site, the buildings highlighted in green correspond to the declared facilities that were under IAEA safeguards, while buildings highlighted in red were used, exclusively or in part, for undeclared nuclear activities.⁸

Beyond its liberal use of undeclared locations within the Tuwaitha site for laboratory-scale activities, Iraq's secret nuclear program also relied on larger developmental and production-scale facilities at other, undeclared sites throughout the country. These included a uranium conversion plant (Al Jesira), two EMIS production plants (Al Tarmiya and Ash Sharqat), a gas-centrifuge development facility (Al Rashdiya), a gas-centrifuge production-scale plant (Al Furat), and a nuclear weapon development and manufacturing plant, as well as various equipment manufacturing plants that supported them. (Not all of these sites were yet operational.) Figure 2 shows how widely dispersed these various sites were.

⁸ Figure adapted from David Albright, et al., "Development of the Al-Tuwaitha Site: What If the Public or the IAEA had Overhead Imagery?" www.isis-online.org, as well as various IAEA reports to the UNSC.

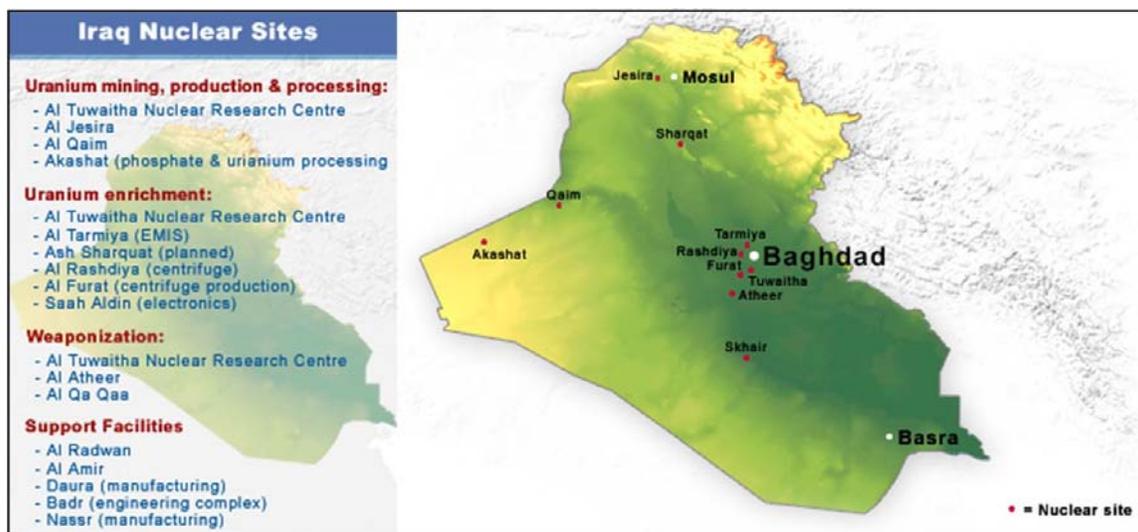


Fig. 2. Production-scale operational and manufacturing-support facilities for Iraq's clandestine nuclear program were located at undeclared sites away from the Al Tuwaitha nuclear research center.⁹

Of these undeclared sites, at least the Al Tarmiya site already had come under suspicion by at least one Member State before the Gulf War. Before its departure from Vienna, the first IAEA UNSCR 687 inspection team was briefed on the Tarmiya site and told to look for evidence of uranium enrichment, albeit by the gas-centrifuge method. Had this information been briefed to the IAEA a year earlier, before UNSCR 687, it is not clear that the IAEA would have had a plausible way to follow up on such a lead without much more powerful evidence that would have been needed in order to justify a call for a special inspection.

2.2. Pre-34(c) Uranium or Thorium and Exempted Nuclear Material

Although Iraq properly declared, and refrained from misusing, the large quantities of uranium ore concentrate that it had imported from Niger and Portugal, Iraq also produced indigenously more than 100 tons of uranium ore concentrate at Al Qaim and used it as feed material for the Al Jesira conversion facility. Under Iraq's INFCIRC/153 agreement, the IAEA did not receive information about the location, scale of production, or this material containing uranium because it was pre-34(c), i.e., it had not attained the composition or purity specified in Para. 34. (c) and therefore did not invoke the procedures in INFCIRC/153 that call for such reporting. Thus, the IAEA had no effective way to detect or investigate its diversion to non-peaceful activities. Iraq also used another category of uninspected material—material that had been exempted under the small quantity exemption provisions of Paragraph 37, to support small-scale fuel cycle research at Tuwaitha in support of the secret program.

⁹ Figure taken from IAEA Iraq Nuclear Verification Office fact sheet, <http://www.iaea.org/OurWork/SV/Invo/factsheet.html>

2.3 Nuclear Fuel Cycle Activities not involving Nuclear Material

As IAEA inspectors investigated Iraq's multifaceted undeclared program, they soon came to appreciate how many specialized research, development, and manufacturing activities *not* involving material supported the program. The EMIS program required facilities for machining of magnet poles, separator chambers, ion sources, graphite collector pockets, and power supplies. The gaseous diffusion enrichment program, before it was abandoned in 1987, had been involved in manufacture of diffusion barriers. The gas centrifuge program required equipment for manufacturing rotors and other components and for balancing and testing assembled gas centrifuges; rotors, as well as test stands to test machine performance. While none of these activities involved nuclear material, they all were sufficiently specialized that if they had been known to the IAEA, they would have been indicative of the likely existence of undeclared nuclear activities. But because they did not involve nuclear material or nuclear facilities, they did not have to be reported by Iraq under its INFCIRC/153 safeguards agreement.

2.4 Imports

Iraq's undeclared program relied quite extensively on imports of nuclear-use-specific non-nuclear materials, equipment, and technology that had not been reported to the IAEA by the exporting state. Examples include the designs and equipment for the Al Jesira UO₂ and UCl₄ conversion plants; specialized high-voltage power supplies for the EMIS installations at Al Tuwaitha and Al Tarmiya; and gas centrifuge assemblies, centrifuge components, and auxiliary cascade equipment for the centrifuge enrichment program. Under INFCIRC/153, there was no basis for suppliers to notify the IAEA of such exports so that the Agency could confirm with the receiving state that the items indeed were destined for safeguarded, peaceful-use activities. This gap helped Iraq's secret program remain under the radar for so long.

2.5 Notification of Nuclear Facility Construction

While some of the major undeclared facilities in Iraq's undeclared program already were operating with nuclear material by the time of the Gulf War (e.g., Al Jesira and Al Tarmiyah), some other large nuclear facilities (e.g., Ash Sharqat, Al Furat, and Al Atheer) were at an advanced stage of construction but were not yet at the point of introducing nuclear material. Under the terms of the Subsidiary Arrangements to Iraq's safeguards agreement, it was under no firm obligation to notify the IAEA of the fact of these latter facilities until it was within 180 days of introducing nuclear material.

2.6 Investigative Tools

Not only did the IAEA's experience in Iraq highlight limitations of INFCIRC/153, it also provided an opportunity to demonstrate the safeguards value of certain tools and

approaches that could in principle be used even within the IAEA's INFCIRC/153 authorities.

- Iraq was the first time the IAEA made use of environmental swipe samples, including mass-spectrometric analysis on an individual particle basis. Previously the province only of Member State intelligence services, this technique proved to be a powerful method of detecting undeclared activities in proximity to a sampled location.
- Iraq was the first case in which the IAEA made substantial use of member-state intelligence and other third-party information. The first inspection team was alerted to suspect locations within the Tuwaitha site and Tarmiya; the second team was guided to other EMIS-related sites and, importantly, to locations where EMIS equipment was being concealed; and the sixth team was directed by Member State information to locations where extensive documentation of the undeclared nuclear weapon program was stored. Based on this experience, Director General Blix stressed to the Security Council and the Board of Governors that for the IAEA to be successful in detecting undeclared activities, it needed to use all information available to it, including information from third parties concerning suspect locations.
- The diversity and complexity of Iraq's multi-pronged, multi-site clandestine nuclear program highlighted the need for systematic, state-level analysis of a state's nuclear program as a whole, as a complement to the facility-centric approach of traditional safeguards. In order to get an adequate picture of Iraq's nuclear program, it was necessary to analyze nuclear program elements that were distributed across multiple sites and that involved both nuclear material processing and R&D and specialized manufacturing activities. Iraq also showed the necessity and value of recruiting to the IAEA staff members with skills and experience in new areas, such as gas-centrifuge enrichment, weaponization, and information collection and analysis.

3. NORTH KOREA

IAEA inspections in the Democratic People's Republic of Korea (DPRK) began shortly after the DPRK brought into force its NPT safeguards agreement and submitted the required initial declaration. These inspections also illustrated the need to focus more attention on verification that States' declarations were complete and to strengthen the Agency's ability to detect undeclared nuclear activity. They also demonstrated challenges in invoking its authority (special inspections) and highlighted the importance of third-party information.

In contrast to the UNSCR 687 inspections in Iraq, the IAEA's inspections in the DPRK 1992-1993 were carried out in the framework of a conventional NPT safeguards agreement. Nevertheless, the question of undeclared nuclear materials was an important

issue. The DPRK had already been operating significant nuclear facilities outside the purview of safeguards before its safeguards agreement (INFCIRC/403) entered into force on 10 April 1992. Shortly thereafter, in accordance with INFCIRC/403, the DPRK transmitted to the IAEA its “initial report on all nuclear material which is to be subject to safeguards hereunder.” The IAEA recognized that it would have to address both the correctness and the completeness of this declaration, especially to look for and assess any indications that more nuclear material had been produced than had been declared.

In mid-1992, the IAEA began ad hoc inspections to verify the initial DPRK declaration. As expected, it declared several indigenous nuclear facilities whose existence had been widely alleged in open sources but which had not officially been disclosed until then. Significant among these newly declared facilities were a 5-MW(e) gas-graphite reactor and a “radiochemical laboratory” (in reality a large spent-fuel reprocessing plant) at Yongbyon.

DPRK authorities declared that with the exception of a few dozen damaged fuel elements, no fuel had been discharged from the gas-graphite reactor, and they also told the IAEA that only a small amount of plutonium, less than 100 grams, had been separated at the reprocessing plant, all of it from a single reprocessing campaign using the damaged fuel elements. But the IAEA’s analysis of plutonium samples and of environmental swipe samples from plutonium-processing glove boxes indicated that, in fact, there had been several reprocessing campaigns, not just one, thus calling into question the veracity of the DPRK’s account.

Third party satellite imagery provided the Agency with a valuable piece of the puzzle. The U.S., in particular, was skeptical of the DPRK declaration and believed that a large quantity of spent fuel, up to a full core, might have been discharged in 1989 and reprocessed and that evidence of this suspected activity was being hidden from the IAEA. It provided the IAEA with satellite images showing two undeclared structures, not far from the reprocessing plant, that appeared to be radioactive waste storage sites whose function the DPRK had attempted to disguise.

Because analysis of radioactive waste that might be stored at these two sites would help clarify how much plutonium the DPRK had produced, the IAEA requested access to them. DPRK authorities refused, saying that they were military facilities that had nothing to do with the reprocessing plant. Then IAEA Director General Hans Blix, invoking the provisions of paragraphs 73 and 77 of the safeguards agreement, formally requested a special inspection. When the DPRK rejected this request, Blix reported the matter to the Board of Governors for urgent action, and the Board, as provided for in Paragraph 18 of the agreement, demanded that the DPRK grant the special inspection within the next three months. (This was the first time in history that the IAEA had invoked its Paragraph 18 to demand a special inspection without delay.¹⁰) This demand, too, was met with rejection and a threat to withdraw from the NPT, at which point the Board found the

¹⁰ Only one special inspection had been carried out prior to this, it being conducted at the request of the government of Romania to clarify activities that had been pursued by a prior government.

DPRK in breach of its safeguards agreement and reported the non-compliance to the Security Council.

The Security Council, too, called on the DPRK to fulfill its safeguards obligations, but it did not succeed in compelling DPRK compliance and tensions increased. One outcome of the Security Council's actions was the initiation of negotiations between the U.S. and DPRK. These bilateral negotiations resulted in an Agreed Framework under which the Yongbyon nuclear facilities would be frozen under IAEA supervision pending the implementation of various additional actions agreed by the parties.

Although the international community was unable to compel DPRK compliance, the IAEA for its part had successfully performed its role of detecting, investigating, and reporting indications of non-compliance. It had made good use of new verification techniques, particularly its analysis of environmental samples from the Radiochemistry Laboratory, which had indicated serious inconsistencies with the DPRK's reprocessing declaration.

The IAEA also showed a willingness and ability to receive and act on compelling third-party information. This was a major evolution in thinking for the Agency, which had previously been averse to accepting outside information. When the Secretariat presented the U.S. satellite imagery that suggested undeclared storage sites for reprocessing waste, the reaction of the Board of Governors was essentially "stunned to silence."

Exposing DPRK non-compliance while operating within the framework of an INFCIRC/153-type safeguards agreement was probably made easier by the fact that the suspect undeclared activities all had taken place at or adjacent to the declared nuclear facilities at Yongbyon. And even though the IAEA succeeded in this case without the sort of additional information and access rights that later would be embodied in the Model Additional Protocol, the DPRK served as another reminder that verifying that all nuclear material has been declared is just as crucial as verifying the non-diversion of declared material.

The IAEA would face in South Africa a situation similar to that in the DPRK. It had to verify the initial declaration in South Africa, which prior to bringing its NPT safeguards agreement (INFCIRC/394) into force in 1991, had also operated significant nuclear facilities that had not been subject to safeguards.

4. SOUTH AFRICA

When South Africa ratified the NPT in July 1991 and concluded an NPT safeguards agreement with the IAEA in September 1991, the IAEA found itself facing an unusual challenge. Before joining the NPT, South Africa had built and operated uranium enrichment plants and other nuclear facilities that were not subject to IAEA safeguards. It also was widely assumed to have had a program to develop and build nuclear weapons, a program South Africa was arguably not obligated to disclose to the IAEA provided that it no longer was in possession of nuclear weapons or undeclared nuclear material.

In any case, it was clear that the task of verifying a state's initial declaration under circumstances where such extensive nuclear activities already had been carried out in the past would require extensive effort. Simply taking the state's nuclear material inventory declaration at face value and verifying the subsequent non-diversion of declared nuclear materials would not resolve the question of whether all nuclear material had been declared. Recognizing this challenge, the IAEA General Conference in September 1991 adopted a resolution requesting the Director General to verify the *completeness* of South Africa's nuclear material declaration.

The IAEA assembled an experienced team of senior safeguards inspectors to carry out this task. South Africa provided extensive cooperation with inspectors, permitting access to any locations the IAEA deemed necessary and permitting the use of additional measures such as environmental sampling.

In its initial report to the IAEA listing nuclear material subject to safeguards, South Africa did not mention its past nuclear weapon program. After IAEA inspections began in 1991, but before the nuclear weapon program was declared, the IAEA investigated two strong weaponization indicators. One was a nuclear test shaft at Vastrap in the Kalahari Desert, which was concealed by a concrete pad that was being used for automotive maintenance. The second facility was an abandoned critical facility located just outside the security fence of the Pelindaba nuclear site.

Agency pressure on South Africa to explain these facilities, as well as some inventory discrepancies, contributed to the South African decision to declare its past nuclear weapon program. In 1993, South Africa disclosed that it had manufactured and subsequently dismantled six nuclear weapons, and it voluntarily requested that the IAEA verify this as part of its investigation. The agency was granted permission to conduct inspections at any relevant location and to interview former managers and workers about the program. The IAEA augmented its safeguards team in South Africa with, among other specialists, nuclear weapon experts.

The IAEA was faced with a daunting task of verifying the termination of South Africa's nuclear weapon program. Fortunately, in both the nuclear-material-related and weaponization-related investigations, South Africa provided the IAEA with unprecedented access and transparency, helping the IAEA to conclude that there were no indications suggesting that South Africa's nuclear-material inventory was incomplete. The experience in South Africa indicated that the IAEA, when operating in a transparent environment with broad access to nuclear and non-nuclear sites, could conclude with reasonable assurance that a State's nuclear program is committed to peaceful uses. This is another example of the valuable experience the IAEA drew upon later when developing the Model Additional Protocol.

Events during these three nearly concurrent cases contributed to a broad consensus that the NPT safeguards system needed to be strengthened to make it more capable of detecting and investigating indications of undeclared nuclear materials and undeclared nuclear activities, and of providing credible assurance of their absence. Not only did

these cases provide the political impetus for strengthening IAEA safeguards, but there were also numerous lessons to be drawn.

These cases provided circumstances in which the IAEA could provisionally employ and evaluate significant new investigative tools and approaches, many of which later would be adopted more broadly as a routine part of safeguards. While some of the new measures could be implemented on the basis of the IAEA's existing authorities under INFCIRC/153-type comprehensive safeguards agreements, it was recognized that there were critical gaps in INFCIRC/153 that limited the Agency's ability to carry out its mission effectively.

III. THE NEGOTIATION OF THE MODEL ADDITIONAL PROTOCOL - SETTING THE STAGE: 1991-1996

1. INTRODUCTION

Immediately after the discovery in Iraq of its violations of its NPT safeguards agreement, the Director General of the IAEA, Hans Blix, declared that the safeguards system needed to be strengthened and urged IAEA's Member States to do so. For example, in 1991, speaking before the U.S. Senate Foreign Relations Committee,¹¹ he said that, "The challenge of Iraq has provided the international community and the IAEA with the opportunity to develop a much strengthened safeguards system that can give assurance that nonproliferation pledges are being respected," and that, "lessons learned from our unique, wide ranging inspections in Iraq show us some ways the IAEA's safeguards inspection system should be given sharper teeth." The Director General highlighted, in particular, the need for the IAEA to have enhanced access to information, including export data, to locations where there is reasonable suspicion, and to the UN Security Council. He wanted to enhance the Agency's right to unannounced inspections, to obtain more flexible visa requirements for inspectors, and to have increased access to relevant third-party information.¹²

As this report will describe, Member States on the Board wondered just what sort of "teeth" the Agency would need both to verify effectively the non-diversion of nuclear material and to detect possible undeclared facilities and activities. This was a reflection of Member States' concerns regarding the possible negative impact that a more aggressive safeguards system would have on Member States' peaceful nuclear activities.

¹¹ From <http://www.fas.org/news/un/iraq/iaea/dgsp1991n06.html>

¹² See DG Blix, Plenary Statement, General Conference 1992. At http://www.iaea.org/About/Policy/GC/GC35/GC35Records/English/gc35or-333_en.pdf

2. CORE ISSUES THAT WOULD AFFECT MEMBER STATES

Two broad objectives – enhanced access to information and locations - were at the core of the ensuing discussion about how best to strengthen the IAEA’s capabilities. The Agency required additional information on states’ nuclear activities and expanded access to locations in order to confirm both the accuracy of such information and its completeness. These issues were not mutually exclusive and involved a series of nested issues that had to be disentangled and resolved before Member States could come to a consensus and endorse what would become the Model Additional Protocol.

First, the amount and type of information that states would be required to provide to the IAEA would need to be greatly expanded. In addition to the INFCIRC/153 requirement for data about nuclear material and facilities that use it, proposals for strengthening safeguards called for an "expanded declaration" on a broad array of additional nuclear fuel cycle-related activities, including, for example: early provision of design information, nuclear fuel cycle-related research & development (R&D), certain manufacturing activities, and the status of closed down or decommissioned facilities.

Enhanced access to information also included proposals to expand the scope of the reporting scheme of nuclear-related inventories and imports and exports. One of the major issues was determining which items were deemed relevant to efforts to strengthen the safeguards system. Member States considered whether to include nuclear material that had not yet reached a composition suitable for fuel fabrication or enrichment (i.e., before the INFCIRC/153 starting point of safeguards).

They also considered the merits of reporting on exports or imports of sensitive equipment and non-nuclear material. Key questions were what kinds of items and who would define them. For example, were military-related items to be included? What about dual-use items, which have both nuclear and non-nuclear uses? Would it be appropriate to refer to the list of items used by the Nuclear Suppliers Group or the Zangger Committee? Or selected items from that list?

The second core issue involved questions regarding enhanced access to locations, i.e. where could inspectors go, under what circumstances, and what could they do when they got there. Under INFCIRC/153, access was limited during routine inspections to “strategic points”, which essentially permitted access only to certain places in declared facilities. A special inspection authority allowed the Agency to move beyond these locations, but the right was rarely invoked in practice, in part because the threshold for seeking access was considered to be high. What is more, inspectors’ ability to conduct no-notice inspections was hampered by procedural limitations, such as inflexible visa requirements. The Model Additional Protocol would eventually provide expanded access to the entire site of declared facilities, as well as access to decommissioned facilities, manufacturing locations, and locations elsewhere within the state. It would also provide the IAEA inspectorate with more favorable treatment with respect to designation of inspectors and issuance of visas, prerequisites for any access at all.

During the period from 1991 to 1996, there were numerous formal and informal discussions on how to define the breadth and depth of new safeguards measures under consideration. There was intensive scrutiny of proposals from the Secretariat and from Member States on what measures to adopt. Many survived this scrutiny, but others did not. For example, the issue of whether Member States should report on dual-use equipment (a measure strongly supported by the U.S) emerged in early discussions, but it had been dropped before the first draft of the Model Additional Protocol was presented to the Board in June 1996.

As a result of this process, broad agreement had been reached on a way forward and many issues were resolved prior to the establishment of Committee 24 in 1996. Of course, many other issues remained unresolved and details remained to be settled. One issue pertained to the limitations arising from the constitutions and legislations of states. States recognized early that some of the proposed measures regarding the provision of information and additional access went beyond the scope of their legislation with respect to the typically heavily regulated nuclear industry and would thus have to be reviewed with their legal and constitutional requirements in mind. For example, information on nuclear-related private sector activities and the rights of individuals would emerge as a particular concern to be dealt with during Committee 24.

3. KEY FORUMS

By and large there was agreement among Member States that the safeguards system was in need of repair. The goal was to find a reasonable balance that both met the Agency's need to adapt in order to respond to the challenges it confronted, but was cognizant of the concerns of States affected by proposed new measures. But in what forums were these issues discussed and who were the key players that influenced the debate? The following is a brief description of those involved in the negotiation of the Additional Protocol:

- The Agency's Standing Advisory Group on Safeguards Implementation (SAGSI) played an important role early in the process. Established in 1975, SAGSI is comprised of safeguards experts from IAEA Member States, who are appointed by the IAEA Director General and serve in their personal capacity. SAGSI serves as an important external source of advice for the IAEA Secretariat on safeguards-related issues and was instrumental in developing safeguards design parameters such as the significant quantity, establishing timeliness goals, and developing the format for reporting on safeguards performance in the IAEA's Safeguards Implementation Report (SIR). As such, SAGSI was a logical choice to include in the process. It was SAGSI's recommendations that were submitted to the Board of Governors in 1993 that served as a basis for the specific measures under debate from 1993 forward.
- The Board of Governors is the policy making body of the IAEA comprised of 35 Member States selected in accordance with Article VI of the Agency's Statute. It has a broad geographic distribution and, by design, includes the countries that are most advanced in the nuclear field. It generally meets five times a year. The Board exercises exclusive power in most matters, including safeguards. It played

an active and influential role in the history of the Model Additional Protocol by providing Member States a forum in which to express their views with respect to the various proposals under consideration as well as taking decisions on key issues as the discussion proceeded.

- The Agency established "Programme 93+2" in 1993. Its purpose was to assess, further develop, and test SAGSI's recommendations and other potential measures for strengthening and improving the cost-effectiveness of safeguards. Programme 93 +2 was comprised of a programme manager, six task officers and representatives from the Legal and External Relations Divisions, all of whom would investigate the technical, legal and financial implications of the recommendations put forward by SAGSI.
- Discussions also took place in unofficial forums. The Agency invited Member States to consult with it directly. Additionally, Member States took it upon themselves to coordinate bi and multi-lateral meetings at the margins of the debate.

Such forums served an important filtering and refining function upon which Committee 24 would draw to develop the Model Additional Protocol. They also served as opportunities for Member States to highlight common interests and identify areas where individual interests diverged, in which case, careful compromises and at times concessions emerged in order to move the process forward. Based on these common interests, Member State participation can be categorized into the following three main groups.

4. KEY PARTICIPANTS IN EFFORTS TO STRENGTHEN SAFEGUARDS

4.1. Like-minded NPT Parties

The negotiation process was dominated by like-minded NPT parties who shared the primary goal of strengthening the nonproliferation regime through improvements to the safeguards system. However, there were differences in opinion among these states about how best to achieve this in practice. Non-nuclear-weapon states (NNWS) with significant nuclear industries had to consider the extent to which the costs and potential intrusiveness of more stringent safeguards would impact domestic implementation. As NPT nuclear-weapon states (NWS), the interests of the US, UK, France, Russia and China were not directly affected by concerns about domestic implementation. The tendency of NWS was to support the most stringent form of strengthening measures, though the views of China were not always as consistent.

It is important to note the important role played by the U.S. throughout the process of the development of safeguards strengthening measures and the negotiation of the Model Additional Protocol. Led by the U.S. Arms Control and Disarmament Agency and with strong support from an interagency team, especially the Departments of Energy and State,

the U.S. supported the effort to strengthen the safeguards system from start to finish. In addition to numerous consultations with the IAEA, the U.S. regularly consulted with friends and allies. Numerous diplomatic messages were sent to capitals to help reinforce U.S. positions. The U.S. also had the benefit of being able to take advantage of support from the senior-most levels of the U.S. government, including the White House. This support played a pivotal role in the negotiations within Committee 24.¹³

4.2. The Group of 77 (G-77)¹⁴

The G-77 consists of developing countries. Their direct interest in improving safeguards was generally limited and frequently tempered by their desire to preserve valuable technical assistance from the Agency—a resource they feared would become limited for by the desire to improve safeguards.

4.3. INFCIRC/66 STATES¹⁵

There was also a small group of Member States that were not parties to the NPT, but had in place INFCIRC/66 safeguards agreements, which restrict the application of safeguards to specific nuclear facilities. The primary concern of this group was to ensure that the new safeguards measure did not apply to them. Their goal was to limit the applicability of the Model Additional Protocol to states with comprehensive safeguards agreements.

5. 1991-1993: STRENGTHENING SAFEGUARDS – EARLY STEPS

Initially, the Secretariat and Member States looked for means to strengthen safeguards by taking better advantage of the authorities given to the IAEA in INFCIRC/153, but they, of course, did not limit themselves to only such measures. Where authority already existed, action could be achieved relatively quickly. As a result, the Board of Governors made three key decisions to strengthen the safeguards system in ways that did not require

¹³ According to Meier, initial German support for strengthening safeguards could at best be characterized as very reluctant. “Germany at first tried to prevent such an initiative by dragging its feet in the negotiations and also opposing some of the measures. Once the political leadership had taken the initiative (it took a personal call from President Clinton to Chancellor Kohl to support a change of the German position), economic criticisms were overruled.” Oliver Meier, paper presented at the conference “Germany as a Civilian Power – Results of Recent Research,” Trier University, December 11-2, 1998. In March, 2009 found at <http://www.bits.de/public/articles/trier98.htm#fnverweis59> .

¹⁴ The Group of 77 (G-77) was established on 15 June 1964 by seventy-seven developing countries signatories of the “Joint Declaration of the Seventy-Seven Countries.” Its intention is to help developing states pursue common goals and develop leverage in United Nations deliberations. (See G77.org.)

¹⁵ NPT NWS and states not party to the NPT are not required to have safeguards agreements with the IAEA. However, the five NPT NWS (China, France, Russia, UK, and US) have each concluded so-called voluntary offer safeguards agreements. Each of the non-parties to the NPT (DPRK, India, Israel, and Pakistan) have safeguards agreements in force that apply to specifically identified items, including, for example, facilities, nuclear material, and heavy water. These are called INFCIRC/66 agreements because they are based on the pre-INFCIRC/153 safeguards system reproduced in that Information Circular and its revisions.

new authorities. These related to special inspections, design information, and information about the exports of nuclear material and specified equipment and non-nuclear material.

5.1. Special Inspections and Design Information Verification (GOV/2554)

The first proposal for strengthening safeguards was submitted to the Board of Governors by the Secretariat in November, 1991. Entitled *Strengthening of Agency Safeguards: Special Inspections and the Provision of Design Information* (GOV/2554), it dealt with matters that were within the existing authority of the IAEA: (a) the right of the Agency to conduct special inspections; and (b) the requirement for states to provide the IAEA with design information.

Attachment 1 of GOV/2554 sought to clarify and express recognition of existing legal authorities under INFCIRC/153 to conduct special inspections, both in declared facilities and in undeclared facilities and locations. It further stated the Director General's intention to make appropriate use of such inspections if conditions should warrant further verification of states' compliance. It also observed that information about possible undeclared activities, which could trigger a special inspection, could be gathered from outside the safeguards system, for example from open sources such as scientific journals; from information related to exports of sensitive equipment and non-nuclear material; and from information "collected by Member States through national means."

GOV/2554 also noted the intention of the Director General to set up a small unit under his immediate direction to assess the information received on a continuous basis. The unit would make use of safeguards-acquired information and all other relevant information in its continuous assessment of the completeness of the declarations of States under their safeguards agreements.

GOV/2554 asked the Board to take note of the Director General's intention to make use of special inspections, to request states to provide information voluntarily, and to set up the suggested new unit. With respect to affirmation of the right of the Secretariat to conduct special inspections, there was little opposition to the essence of Attachment I of GOV/2554, in part because the Agency had already sought Member State approval in informal consultations. Pakistan did remind the Board of the voluntary nature of Member States' safeguards agreements, and that any changes would have to be made on an individual basis (GOV/OR.776 ¶66).¹⁶

In addressing the issue of special inspections, the Board reached the following decision in its meeting of 25 February 1992 (GOV/OR.776 ¶48):

¹⁶ The designator OR refers to the operating records that summarize comments made during Board of Governors meetings.

The Board urged the full exercise of all Agency rights and obligations as provided under the Statute and in all comprehensive safeguards agreements (i.e. those which are based on the guidelines set forth in INFCIRC/153 (Corrected), as well as others which provide for the application of Agency safeguards to all nuclear materials in all peaceful nuclear activities within a State). The Board reaffirmed the Agency's right to undertake special inspections, when necessary and appropriate as described in the above-mentioned agreements and to ensure that all nuclear materials in peaceful nuclear activities are under safeguards. The Board anticipates that these special inspections should only occur on rare occasions. The Board further reaffirmed the Agency's rights to obtain and to have access to additional information and locations in accordance with the Agency's Statute and all comprehensive safeguards agreements.

While the Board reaffirmed the right of the Agency to conduct special inspections, it is noteworthy that it expressed its anticipation that they “should only occur on rare occasions.” It is not clear whether the Board’s view (or its Members) was predicated on the anticipation that violations would be rare, so there would be no need for special inspections, or whether it anticipated that even when there was a need to investigate potential violations, the use of the special inspection authority would be a last resort.

On the other hand, the Director General’s statement that the Secretariat should take into account information provided by States on a voluntary basis, including that collected through national means, proved to be controversial. Strongly supported by some and opposed by others, the Board’s decision during that meeting does not speak directly to the issue.

As a consequence, Germany and Belgium (GOV/OR. 776 ¶50 and 53) intervened after the decision was taken to express their disappointment that the compromise formulation adopted by the Board of Governors in dealing with special inspections had omitted reference to third-party information, information that had been highlighted in the Secretariat’s paper.

While the Chairman (GOV/OR.776 ¶47) was of the opinion that the issue was resolved, as Member States had reached agreement in informal consultations, the German representative nevertheless said:

... it was the Director General's responsibility to decide whether and when to arrange for special inspections in accordance with the applicable safeguards agreements [and] ... the Director General had the authority and indeed the responsibility to use **all information available to him regardless of its source**, after critical assessment of such information in collaboration with his staff, in particular the Deputy Director General for Safeguards. [Emphasis added]

Belgium supported Germany's statement and observed that the text made no reference to the Agency's access to information which could indicate the need for a special inspection and that GOV/2554 had devoted considerable attention to that subject, referring, for example, to the Director General's intention to invite all Member States to provide him with relevant information; his intention to take appropriate organizational measures to ensure an Agency capability to receive and evaluate that information; and the Secretariat's reiteration that the conduct of special inspections was based on three essential requirements, the second of which was the right of access to all credible information and a corresponding obligation on the part of States to provide that information.

Belgium had proposed text that would reflect its views, but it was not incorporated in the Board's decision. Though the Chairman made note of this view, the summary nevertheless did not include Belgium's proposal or a specific reference to provision and use of third-party information.

France suggested that the agreed text permitted the Director General to request special inspections "on the basis of all the information available to him," but others spoke only of additional information.

5.2. Submission of Design Information

Member States were far more concerned about the proposals contained in Attachment II of GOV/2554 regarding the provision of facility design information. With respect to design information, GOV/2554 proposed that instead of requiring the submission at 180 days prior to the introduction of nuclear material, states should amend their Subsidiary Arrangements to apprise the Agency of preliminary facility design information "as soon as the decision to construct, to authorize construction, or to modify has been taken." It also called for the submission of information at subsequent stages of construction and testing. The aim of this proposal was to:

- 1) Reduce the prospect that States could bring new nuclear facilities to the point of operating with nuclear material without the Agency being aware of them;
- 2) Remove any ambiguity regarding a State's intention to place new facilities under safeguards; and
- 3) Facilitate the development of the relevant safeguards approach.

For the most part, the nuclear-weapon states fully endorsed the proposed measures (GOV/OR.777 UK ¶9, France ¶30, Russia ¶33, U.S. ¶47). China was the only nuclear-weapon state that did not comment.

Other Member States seemed to support the measures in principle, though some were apprehensive about the practical difficulties in supplying nuclear facility design information at the early stages of development. Germany (GOV/OR.777 ¶4), supported

by Cuba (¶23) Canada (¶35,) and Egypt (¶52), asserted that it would be difficult to determine what information was relevant at the earliest stages of a construction project. Bulgaria (GOV/OR.777 ¶46) noted that foreign assistance in facility design was sometimes a factor and that states would need to request cooperation and consent to supply the Agency with information from these entities. India and Zaire (GOV/OR.777 ¶17 and ¶55) further contended that information at the earliest stages of design was too trivial and expensive to collect and would place undue strain on Member States. Other G-77 states expressed similar concerns regarding costs (GOV/OR.777 Mexico ¶12; Cuba ¶25; Indonesia ¶28; and the Philippines ¶59).

Belgium (GOV/OR. 777 ¶54) took the opportunity to express its hope that the safeguards measures under consideration be applied on a universal basis--an issue that was frequently expressed by non-nuclear-weapon states. However, states with INFCIRC/66-type agreements rejected any sort of holistic approach, and pointed out the voluntary nature of safeguards agreements (Cuba GOV/OR.777 ¶22). India and Pakistan (GOV/OR. 777 ¶17 and ¶37) suggested that the problem was not with existing measures, but with the lack of implementation in states with comprehensive safeguards agreements. Both preferred not to introduce new measures, but to encourage better enforcement under the current system. These comments were consistent with this group's desire to avoid changes that might affect the current limited approach to safeguards applied to their states.

As a possible compromise, Brazil, also speaking on behalf of Argentina, proposed requiring design information in stages, including a preliminary Design Information Questionnaire prior to construction (GOV/OR.777 ¶14).

On the basis of these comments, the Secretariat revised its proposal and submitted the revision to the Board in GOV/2554/Attachment 2/Rev.1 in January 1992. This was considered at the February 1992 meeting of the Board of Governors. The proposal called for states to inform the Agency of their programmes for new nuclear facilities and provide preliminary design information as soon as the decision to construct, to authorize construction or to modify had been taken; to provide further information in stages; and to provide a completed Design Information Questionnaires for new facilities based on preliminary construction plans as early as possible, as and in any event not later than 180 days prior to the start of construction.

The final version included textual amendments proposed by Germany (GOV/OR.777 ¶7). These amendments involved the switching of subparagraphs (a) and (b) and some other minor changes to reflect the pre-eminent role of safeguards agreements over that of states' subsidiary arrangements. With these changes the Board approved the Secretariat's proposal as follows:

It is recommended that the Board: (a) call upon all parties to comprehensive safeguards agreements to provide the information described in paragraph 6 above; and (b) request the Secretariat and

all parties to comprehensive safeguards agreements to adapt, where appropriate, the related Subsidiary Arrangements.¹⁷

Comments regarding GOV/2554 reflected a genuine interest in strengthening the safeguards system through enhanced access to facility design information. Nonetheless, this general perspective was tempered in the views of a number of states who were concerned by: 1) practical difficulties in implementing the measure - an issue for non-nuclear-weapon states; and 2) INFCIRC/66-type states' desire to prevent the application of any additional safeguards measures in their countries. This theme was consistent throughout the negotiating process.

5.3. Information about Exports, Imports and Production of Nuclear Material, Non-nuclear material and Sensitive Equipment (GOV/2568)

GOV/2568, *Strengthening of Agency Safeguards: 1. Reporting and Verification of the Export, Import and Production of Nuclear Material for States Party to Comprehensive Safeguards Agreements; and 2. Reporting and Verification of the Export, Import and Production of Sensitive Equipment and Non-Nuclear Material for States Party to Comprehensive Safeguards Agreements*, was issued by the Secretariat and submitted to the Board of Governors by the Director General in January 1992.

GOV/2568 covered the reporting and verification of the export, import, and production of nuclear material and reporting and verification of the export and import of sensitive equipment and non-nuclear material for states parties to comprehensive safeguards agreements. The document noted that states parties to INFCIRC/153 were not required to provide complete information on the export, import, and production of nuclear material because they are not required to report transfers of nuclear material if such material has not reached a composition and purity suitable for fuel fabrication or isotopic enrichment and is exported or imported specifically for non-nuclear purposes; nor are reports required of States which neither have safeguards agreements with the Agency nor have undertaken unilaterally to make such reports.; nor on sensitive equipment and material relevant to nuclear activities. It made a series of proposals that would give the Agency a complete accounting of nuclear material and "sensitive equipment and non-nuclear material" in States with comprehensive safeguards agreements and provided for their verification.

Attachment 1 of GOV/2568 proposed for parties to comprehensive safeguards agreements:

- 1) That, regardless of whether or not they fall within current reporting requirements, all **exports** of nuclear material¹⁸ to States with comprehensive safeguards agreements be reported, and that States with comprehensive safeguards agreements report all **imports and**

¹⁷ The version approved by the Board for submission of design information was published in GOV/2554/Attachment 2/Rev.2/ on 1 April 1992. The relevant text is in Annex 1.

¹⁸ The proposal did contain a small quantity exemption.

- exports** of such material, whether the nuclear material is transferred for peaceful nuclear use or peaceful non-nuclear use;
- 2) That parties to comprehensive safeguards agreements report - by location – **domestic production and inventories** of ore concentrates and also - again by location - inventories of nuclear material which is further processed but is not yet of a composition and purity suitable for fuel fabrication or isotopic enrichment; and
 - 3) That the Agency extend its verification activities in States with comprehensive safeguards agreements to cover material which has not reached a composition and purity suitable for fuel fabrication or isotopic enrichment.

In Attachment 2, GOV/2568 proposed a similar system of reporting and verification with respect to “sensitive equipment and non-nuclear material.” It included recommendations that:

- 1) Parties to comprehensive safeguards agreements report to the Agency exports and imports of equipment and non-nuclear material that are on [a list to be established by the Agency];
- 2) All other States report to the Agency exports to and imports from States with comprehensive safeguards agreements; and
- 3) The Agency establish and maintain a record of such exports and imports, and check that reports of exports and imports match and that the equipment and non-nuclear material imported by each State with a comprehensive safeguards agreement is consistent with the State's declared [nuclear program].

In addition, it proposed that, “the Agency verify that the items reported as exported to States with comprehensive safeguards agreements have arrived at the declared facilities in the recipient States and have been installed and continue to be used as declared. Finally, it suggested that to obtain additional assurance that there are no undeclared facilities in States with comprehensive safeguards agreements; it proposed that such States also submit reports - for verification by the Agency – on their current inventories - by location - of the specified equipment and non-nuclear material and on their domestic production - again by location. The proposal called for States to provide the information on a voluntary basis and, recognizing that new legal authority would be needed, asked the Board to request the preparation of a protocol.

The proposals were discussed in an informal presentation to Board members in February 5, 1992, after which the Director General sent a letter to the Chairman of the Board that made two requests. The first was that the reporting requirements be extended to include all States, including nuclear-weapon states. The second request was that any decision regarding the verification activities proposed in GOV/2568 be deferred until after the matter of revising the reporting system was settled (GOV/OR. 777 ¶77).

There was strong support among non-nuclear-weapon states in favor of the Director General's suggestion to extend the reporting regime beyond states with comprehensive safeguards agreements (Belgium (GOV/OR.777 ¶100), Austria (GOV/OR. 778 ¶27), Hungary (GOV/OR. 778 ¶31 and ¶34), Canada (GOV/OR.777 ¶83), Japan (GOV/OR. 777 ¶90), Egypt (GOV/OR.777 ¶104), Germany (GOV/OR. 777 ¶107), Norway (GOV/OR.777 ¶143) and Australia (GOV/OR.777 ¶146). This proposal was also accepted at this time by the UK and U.S. (GOV/OR.777 ¶113 and GOV/OR.777 ¶153).

Member States also agreed with the Director General's proposal to postpone the discussion of verification requirements due to concerns about the cost and skepticism regarding the technical feasibility of conducting such activities. Nonetheless, Governors spoke to this issue with generally negative reactions, especially as it might relate to equipment and non-nuclear material.

Canada, in light of the Director General's request to defer consideration of verification to a later stage, "welcomed the Director General's decision to abandon the proposals on verification" (GOV/OR.777¶84) expressing concerns about their cost and effectiveness. Nuclear-weapon states expressed doubts that verification activities would achieve much, apart from additional expense to the Agency (Russia GOV/OR.777 ¶140) U.S. (GOV/OR.777 ¶153 and ¶157) China (GOV/OR. 778 ¶4 and ¶5). The UK was skeptical about the need to elaborate the verification system for nuclear material but couldn't exclude the possibility of "spot checks" (GOV/OR. 777 ¶114).

Export, Import, and Production of Nuclear Material

The reaction of the Board to the Attachment I proposals for expanded reporting of nuclear material was generally positive, with some reluctance, however, to support production, as opposed to exports and imports (Canada GOV/OR.777¶84). EU states based their support, including production, on an EU decision (see, for example, Germany (GOV/OR.777 ¶107).

There was strong support from most nuclear-weapon states with respect to expanding reporting requirements in states with comprehensive agreements regarding the export and import of nuclear material, and France, the UK, and the U.S. agreed to report. France also supported reporting on production of nuclear material (GOV/OR.777 ¶96) reminding the Board that events in Iraq might have been avoided if the Agency had had access to reporting on transfers, production, and inventories of uranium ore concentrates. Russia (GOV/OR.777 ¶140) contended that the expansion of reporting to the export, import, and production of nuclear and non-nuclear material and sensitive equipment would "unquestionably facilitate the detection of undeclared nuclear activities in states with comprehensive safeguards agreements." Russia was opposed, though, to physical verification of non-nuclear material and equipment.

Export, Import, and Verification of Non-nuclear Material and Sensitive Equipment

Reactions to the reporting of the export, import, and verification of non-nuclear material and sensitive equipment as outlined in Attachment II were generally not as positive. There was opposition (e.g., Canada OR.777 ¶85, U.S. ¶160) and little support for reporting of production or for verification of transfers (Russia GOV/OR.777 ¶140). Japan for example stated that, “Japan was opposed to Attachment 2 in which measures were proposed that went beyond the framework established in INFCIRC/ 153 and that would entail significant changes in national laws and regulations” (GOV/OR.777 ¶91). On the other hand, the EU states had already announced the previous year their support for “a universal reporting regime for the export and import of sensitive nuclear equipment” (Belgium GOV/OR.778 ¶14). For its part, China was more hesitant in its support of reporting on sensitive equipment and relevant non-nuclear material, stating that it was premature to make conclusions without further study and clarification of the items to be included (GOV/OR.778 ¶5).

France did support verification of equipment, which “should be carried out as part of routine inspections and could therefore be neither exhaustive nor systematic” GOV/OR.778 ¶19-20.

The U.S. (GOV/OR.777 ¶163) endorsed expanded reporting of transfers of equipment and non-nuclear material. It further suggested basing the list of items to be reported on the list used by the Zangger Committee or the Nuclear Suppliers Group. This proposal met with resistance from some non-nuclear-weapon states, especially from the G-77. Mexico (GOV/OR.778 ¶12) rejected the U.S. proposal as “tantamount to endorsing the guidelines of a small group of countries ...with no regard for the interests of other Member States which were importers or potential importers of sensitive nonnuclear equipment and material.

Though at this point no Agency or Member State proposal had suggested including dual-use items on the reporting list, Belgium (OR 778 ¶16) specifically expressed reservations about the inclusion of dual-use items because of the technical complexities involved and the type of “high technical qualifications” that would be required to establish and maintain such an extensive list of items. It is noteworthy that Belgium’s reference to dual-use equipment is the first time such items are specifically mentioned in an official Board meeting regarding strengthening the efficiency and effectiveness of the safeguards system.

Other Board Members voiced concerns regarding practical difficulties. India (GOV/OR.777 ¶134) cited difficulties in gathering information from commercial and industrial manufacturers. Nigeria (GOV/OR.777 ¶89), speaking on behalf of G-77 states, resisted supporting measures that might conflict with national laws and regulations and requested that further detail be provided to the Board regarding the type of information States would be required to provide.

Cost-effectiveness was also of concern. Switzerland (GOV/OR.778 ¶37) proposed relying more on regional safeguards regimes, such as EURATOM, as well as states' systems of accounting and control (SSAC). The Director General offered a rhetorical response to these views: "What price were Member States prepared to pay in order to have confidence that the risk of nuclear proliferation in any county which had accepted the pledge of non-proliferation was extremely small?" (GOV/OR.778 ¶40) The Director General's question highlights one of the important tensions that shaped the discussions and outcomes of the Board's consideration of safeguards strengthening measures. That is, the benefits of strengthening the safeguards system on the one hand and the costs of doing so on the other.

5.4 Reporting of Exports and Imports of Nuclear Material and Equipment and Non-nuclear Material – a New Proposal (GOV/2588 and GOV/2589)

5.4.1. The Secretariat's Proposal

The Secretariat revised the proposed measures in GOV/2568 in two separate documents: GOV/2588, *Universal Reporting of Exports, Imports and Inventories of Nuclear Material for Peaceful Purposes*, and GOV/2589, *Universal Reporting of Exports and Imports of Certain Equipment and Non-Nuclear Material for Peaceful Nuclear Purposes*, both of 18 May 1992.

a. Nuclear Material

The documents responded to the concerns expressed by Member States regarding reporting of production and the value and feasibility of Agency verification. With respect to nuclear material, GOV/2588 limited reporting to transfers and inventories and did not cover production or envisage routine verification. It is also proposed that verification would be undertaken only in States with comprehensive safeguards agreements and only if it was required in order to clarify inconsistencies identified through the analysis and evaluation of the data. Nuclear-weapon states and INFCIRC/66 states were also requested to report inventories of nuclear material used for used for peaceful nuclear or non-nuclear purposes.

b. Equipment and non-nuclear material

In GOV/2589, covering equipment and non-nuclear material, the Secretariat responded to Board concerns with a paper that limited reporting to exports and imports, did not cover the reporting of production, and did not envisage routine verification. The Agency would investigate discrepancies found as a result of cross-checks of import and export reporting, and said that verification activities would take place only in States with comprehensive safeguards agreements and only if they were required in order to clarify inconsistencies identified through the analysis and evaluation of the data available to the Agency.

The Secretariat also included in GOV/2589 a list of equipment and non-nuclear material the import and export of which it proposed to be reported. The list was based on the list used by “certain Member States in connection with their commitments under Article III, paragraph 2 of the Treaty on the Non-Proliferation of Nuclear Weapons and on the list used by another group of States in relation to their policy of requiring safeguards to be applied to certain exported items (see INFCIRC/209/Rev.1, INFCIRC/209/Rev.1/Mod.1 and INFCIRC/254).” The former group is known as the Zangger Committee (INFCIRC/209)¹⁹ and the latter is the Nuclear Suppliers Group (NSG) (INFCIRC/254).²⁰ Given the negative reaction of the G-77 to these groups, the Secretariat chose not to use their names. The Secretariat also added listings for equipment for uranium enrichment using technologies based on lasers, chemical exchange, electromagnetic separation and plasma separation.

5.4.2. Towards a Universal Reporting Scheme

Discussion in June of 1992 led to the conclusion that many Members of the Board supported a universal reporting system for nuclear material as well as for exports and imports of equipment and non-nuclear material, but with reservations about reporting of imports and questions about the lists and the modalities of implementation. The Board decided that it wished the Secretariat to examine and revise documents GOV/2588 and GOV/2589 and agreed that all States willing to do so would in the meantime provide the Agency, on a voluntary basis, information about exports, imports, production and inventories of nuclear material and exports and imports of specified equipment and non-nuclear material, in addition to that required under existing safeguards agreements. (GOV/OR.787/¶141).

After various modifications to address concerns raised, on January 22, 1993, the Secretariat submitted to the Board of Governors GOV/2629, *Strengthening the Effectiveness and Improving the Efficiency of the Safeguards System (GC(XXXVI/Res/586): Universal reporting system on nuclear material and specified equipment and non-nuclear material.*

¹⁹ The Zangger Committee was established in 1971 by a group of NPT parties in order to develop a shared understanding of the interpretation of NPT Article III.2. This article requires NPT states parties not to provide nuclear material or “equipment or material especially designed or prepared for the processing, use, or production of special fissionable material” to any non-nuclear-weapon state without safeguards. The major task of the Committee was to establish how to interpret the phrase “especially designed or prepared” (EDP). The list of EDP items is called a “trigger list” because their export triggered the NPT safeguards requirement.

²⁰ The NSG was created following the explosion in 1974 of a nuclear device by India, a non-nuclear-weapon State, which demonstrated that nuclear technology transferred for peaceful purposes could be misused. Unlike the Zangger Committee, whose mandate is to interpret an NPT provision, the NSG was able to agree on export guidelines going further than the NPT. For example, it made exports subject to conditions such as physical protection arrangements and agreed that NSG members should show restraint in exporting enrichment technology. It published guidelines and a trigger list in 1978. In 1992, it agreed on controls for dual-use items, i.e., items relevant to nonproliferation not meeting the EDP condition.

The Director General introduced GOV/2629 by observing that: following consultations GOV/2588 and GOV/2589 had been revised and consolidated into one - GOV/2629 - which contained specific recommendations to the Board concerning the establishment of a universal reporting system. GOV/2629 highlighted the safeguards relevance of a wide range of information, including:

- 1) Information about exports of nuclear material
- 2) Information about imports of nuclear material (suggesting that exporting countries help by notifying the IAEA about exports to countries without adequate import reporting systems)
- 3) Information about the production of nuclear material, including nuclear material which has not reached a composition and purity suitable for fuel fabrication or isotopic enrichment
- 4) Information about exports/imports of special equipment and non-nuclear material for nuclear uses (with the same import condition as above regarding notification from exporting countries about exports to countries without adequate import reporting systems).

It noted that such a reporting system would allow the Secretariat to engage in “follow-up activities” to clarify inconsistencies, but would have no additional access rights for inspection or verification purposes.

Nonetheless, GOV/2629 concluded by noting that the Secretariat had identified certain categories of information about which there is an “emerging consensus as to value and practicality for reporting purposes.” These categories of information included only exports and imports of nuclear material and exports of specified equipment and non-nuclear material.

The Chairman of the Board introduced this text by observing that:

Since then [June 1992], wide-ranging consultations had been held between the Secretariat and Member States, including a useful open-ended briefing held on 17 December 1992. Those consultations had resulted in a radical revision of the previous documentation, and the Secretariat had now produced a single document (GOV/2629) which contained - in Annex II - a proposal for universal reporting on nuclear material and specified equipment and non-nuclear material. (GOV/OR.802¶37)

Indeed it was a radical revision, since it no longer included any reference to production of nuclear material and with respect to non-nuclear material and equipment, it had dropped reference to verification or to reporting of imports.

The Director General reported that most of the major supplier states had informed the Secretariat of their willingness to provide significant elements of the information sought. He recommended that the Board endorse the establishment of a “System of Universal Reporting on Nuclear Material and Specified Equipment and Non-nuclear” that reflected

some of the considerations discussed at the June 1992 Board of Governors meeting and additional consultations with Member States.

The vast majority of states accepted these recommendations as recorded in GOV/OR.802, though some additional caveats were proposed. Sweden (GOV.802 ¶41) agreed to provide export information on a voluntary basis, though felt the reporting system should be subject to a one-year trial basis. Egypt (GOV/OR.802 ¶77) similarly suggested a trial period of two years.

China, Mexico and Algeria disagreed with aspects of the term “universal reporting system” (GOV/OR.802 ¶72; ¶105; and ¶131) asserting that it misrepresented the voluntary nature of the proposal— the term “voluntary reporting mechanism” was a better fit. The Secretariat (GOV/OR.802 ¶5 (a)) responded by acknowledging that though the measure under consideration was voluntary, universality was the ultimate goal.

G-77 states requested several clarifications, to wit, that the reporting was voluntary; that the system did not provide for verification; that it should not adversely affect industrial development in developing countries; that use of the Nuclear Suppliers Group list, reproduced in INFCIRC/254/Rev.1/Part 1 did not represent any approval of that Group (in which the G-77 states were not participants) or its work; and that changes to this list would not become part of the reporting scheme until approved by the Board.

The U.S. (GOV/OR.802 ¶62) suggested the reporting list be updated automatically, unless objections by participating governments were received within six months of changes to the list.

5.4.3. Universal Reporting Scheme Agreed

The Chairman presented his summing up (GOV/OR.803 ¶5), which included the phrase “reporting scheme” instead of “reporting system” or “mechanism” as proposed by a number of states. The Chairman also stated the Board’s wish to “encourage member States and the Secretariat to use the list in INFCIRC/254/Rev.1/Part 1 as it stood; per the U.S. suggestion, amendments to that list would come into effect automatically unless objections to them were received within six months of issue and were subject to the proviso that any State rejecting the amendments would submit its report periodically on the basis of the list which it considered acceptable” (GOV/OR.803¶6(i))

Group 77 states remained unsatisfied with this formulation, preferring that the list first be approved by the Board of Governors. In response, and after considerable back and forth between the Secretariat, the United States, and G-77 states, the Chairman’s summing up was amended to read as follows:

As a practical measure and for reasons of convenience only, to encourage Member States and the Secretariat to use the list in document INFCIRC/254/Rev.1/Part 1 as it stood; amendments to that list for the

purposes of this scheme would be subject to approval of the Board.
(GOV/OR.803 ¶28 footnote [1]).

These comments were reflected in the Chairman's summing up, which included acceptance of the Director General's recommendations and which was approved by the Board (GOV/OR.802 and 803).

After considerable debate, two major issues relating to the reporting scheme were resolved. First, the Secretariat accommodated Member States concerns regarding extensive and costly IAEA verification activities by eliminating any such routine activities for non-nuclear material and specified equipment. Agency activities would be limited to the clarification of inconsistencies in reporting.

Second, the list of items to be used in reporting would be derived from INFCIRC/254/Rev.1/Part 1; and the Board would be required to approve the use of amendments to that list. (This list did not include dual-use items, (a later U.S. proposal), which were added to the Nuclear Suppliers Group list a few months later in INFCIRC/254/Rev.1/Part 2 of July 1992.)

As will be seen in Volume II, the limitations agreed in 1993 were carried over to the Model Additional Protocol with only a few changes.

5.5 Looking to the Chemical Weapons Convention

In considering means to strengthen the IAEA safeguards system, the Secretariat and Member States were also influenced by contemporaneous events that related to verification of international arms control agreements. A particular verification model was the Chemical Weapons Convention (CWC), which was signed in 1993. Its verification provisions were considered to be a potentially useful source of ideas for ways to strengthen the IAEA safeguards system. Although the CWC applies to chemical weapons and the particulars would necessarily be different than for verification of nuclear material, the CWC had been agreed by consensus in the Conference on Disarmament and the verification principles incorporated in the CWC might thus be considered to be broadly acceptable.

In this light, the Director General submitted to the February 1993 Board in GOV/INF/680, *The Relevance of Certain Aspects of the Chemical Weapons Convention to Efforts to Strengthen Agency Safeguards*, proposals for strengthening safeguards through adoption of some of the provisions of the Chemical Weapons Convention (CWC). These were:

- Granting access to locations and records over and above those specified in existing safeguards agreements;
- Facilitating the taking of samples for Agency analysis;

- Acceptance by States of all staff members approved by the Board of Governors for use in inspection activities with the provision that the state would have the option of raising objections at a later stage;
- The automatic granting to Agency inspectors of multiple-entry visas; and
- Granting an inspection team the right to use its own means of communication.

There was limited discussion of these proposals at this time, with some states supporting them, and the G-77 states generally opposing. No Board decision was called for, since GOV/INF/680 was an information document. However the issue would re-emerge during discussions regarding the recommendations put forward by the Standing Advisory Group on Safeguards Implementation (SAGSI), which also played an influential role and additionally supported applying provisions of the CWC.

5.6 Considerations in SAGSI on Strengthening Safeguards

In September 1992, the Director General called on SAGSI to re-examine how safeguards are implemented and advise on ways to reduce costs while meeting new requirements and maintaining effectiveness. With an expanded number of members (up to twenty from its original fourteen-member roster), SAGSI initiated its work in November 1992 and held a series of meetings in February and March of 1993.

In April 1993, SAGSI presented its recommendations to the Director General in the *Report to the Director General on the Thirty-Sixth Series of SAGSI Meetings 19-23 April 1993*. SAGSI identified a number of new measures and technologies that might contribute to the detection of undeclared nuclear activities. In addition to the use of environmental sampling at facilities and at different ranges (for example, distant from facilities or over wide areas) and using air and water sampling techniques, it recommended the use of a number of measures that would take advantage of the availability of information, including the analysis of: publicly available information; information from Member States reporting on import/export and production of nuclear and non-nuclear material and equipment; non-safeguards information; safeguards information; and information provided by Member States. SAGSI also identified a number of alternative approaches for evaluation, for example, greater reliance on SSACs.

Reflecting, in part, the predisposition on the part of some SAGSI members to seek ways to reduce inspection activities, SAGSI also stressed the validity of the principle of a trade-off between the introduction of an enhanced capability to detect undeclared nuclear facilities and a reduction in certain routine inspection activities, calling, as a matter of priority, on the IAEA to establish the cost-effectiveness of a trade-off between an enhanced capability to detect undeclared reprocessing and elimination of interim inspections of spent fuel for timeliness purposes.

Referring to the CWC, which had recently been adopted by the General Assembly at its forty-seventh session, on 30 November 1992, SAGSI stated that it was its “conviction that the Agency's safeguards system must be strengthened so as to provide significant confidence that no undeclared nuclear activities of proliferation relevance are being carried out in states with comprehensive safeguards agreements and that the transfer into the nuclear non-proliferation regime of the greater transparency and openness shown elsewhere by the international community provides the basis for that strengthening.” SAGSI also recommended that the Agency develop a model of the arrangements to use for the investigation of sites of possible undeclared facilities drawing on the elements (including the managed access provisions) contained in Part X of the Verification Annex to the Convention on the Prohibition of Chemical Weapons. These arrangements would complement special inspections.

The recommendations were presented to the Board in GOV/2657 of 14 May 1993, *Strengthening the Effectiveness and Efficiency of the Safeguards System: Report by the Director General on SAGSI's Re-Examination of Safeguards Implementation*. A summary of the SAGSI report was included as an Attachment. Reactions were recorded in GOV/OR.815 and 816, where Board Members voiced their general support for the direction of SAGSI's conclusions.

There were some concerns, however. Spain (GOV/OR.815 ¶170) rejected any reform that included a substantial budget increase, and along with various other Member States, regretted the lack of specific financial estimates for the proposed measures. Germany (GOV/OR.816 ¶16-21) worried that the expanded role of the Agency would make it appear like an “international police force.” It further doubted the reliability of the environmental monitoring methods under evaluation, and expressed reservations with respect to giving an increased role to SSACs. India (GOV/OR.816 ¶74) expressed similar concerns, fearing that the Agency would become “police on the prowl.”

The UK (GOV/OR.815 ¶175-183) felt priorities should be focused on detecting undeclared activities rather than improving safeguards at already declared facilities. The UK also expressed doubt about the value and accuracy of long-range environmental monitoring to detect undeclared activities, and expressed its preference for on-site inspections instead of relying on data transmissions, or “telemetry.” In considering an enhanced role for SSACs, the UK first suggested taking into account political and infrastructure factors, such as whether the country had a good nonproliferation reputation in terms of transparency, stringent domestic inspections criteria, industry outreach, and having an independent regulatory agency. France (GOV/OR.816 ¶63-64) agreed with the UK's position regarding the importance of on-site inspections and the potential over-reliance on SSACs.

Non-nuclear-weapon state members of the Board were also cognizant of the practical and legal implications of implementing such measures at home. Germany (GOV/OR.816 ¶19) said that most of the new arrangements envisaged by SAGSI would probably not be covered by INFCIRC/153-type agreements and would involve additional bilateral arrangements between the Agency and the States concerned. Argentina and Brazil (GOV/OR.816/¶117-118) felt that, although it was too early to make any detailed

judgment, some of the issues examined by SAGSI had political and legal dimensions that would require detailed study on the part of the Secretariat.

The notion of drawing on the Chemical Weapons Convention (CWC) was rejected by some on several grounds:

- 1) The CWC itself was still in its infancy (India GOV/OR.816 ¶76);
- 2) It differed too greatly from the safeguards regime (Algeria (GOV/OR.816¶37);
- 3) It related to a different field and thus its legal framework was not directly applicable (Mexico GOV/OR.816 ¶102).

For its part, the U.S. fully endorsed SAGSI's recommendations, including drawing upon the CWC. Though it did recognize that further field testing would be needed to assess the value and feasibility of environmental monitoring techniques (GOV/OR.816 ¶107).

In summing up, the Chairman noted that a) some Governors had stated that SAGSI's recommendations had far reaching legal, political and financial implications and also implications for their national security, since implementation of those recommendations would mean significant changes in existing legal and institutional arrangements; and b) most Governors agreed with the Director General's view that SAGSI's proposals required further analysis on the basis of which the Secretariat would submit to the Board concrete proposals, including their legal, financial and political implications (GOV/OR.816/¶147-148). Although not mentioned explicitly in the Chairman's summing up, the SAGSI suggestion of a trade-off between an enhanced capability to detect undeclared activities and a reduction in routine inspection activities has remained to this date on the agenda of SAGSI and the IAEA Secretariat.

6. 1993-1996: DEVELOPMENT OF SAFEGUARDS STRENGTHENING MEASURES – TOWARDS A MODEL ADDITIONAL PROTOCOL

6.1 Programme 93+2, November 1993

In November of 1993, the Secretariat informed the Board of its decision to establish a programme to further assess the legal, financial, and political impacts SAGSI's recommendations. This was submitted to the Board in GOV/2698 of 3 November 1993, *Strengthening the Effectiveness and Improving the Efficiency of the Safeguards System: Report by the Director General on the Secretariat's program for assessment, development and testing of SAGSI's recommendations on the implementation of safeguards.*

This programme, arguably the most extensive examination of safeguards undertaken by the Secretariat, was intended to produce implementation proposals by early 1995 and became known as “Programme 93 + 2.”

The programme was to be divided into seven tasks areas:

- 1) Cost analysis of present safeguards system
 - a. Trade-off being detection of undeclared facilities instead of some routine inspections
- 2) Define the extent possible of Increased SSAC cooperation
 - a. Greater pre-inspection and other preparatory involvement
 - b. Shared training/research and equipment
 - c. Using SSAC’ inspection results to reduce Secretariat inspections
- 3) Environmental monitoring techniques
 - a. Field trials
- 4) Technical, legal and financial implications of other measures
 - a. Expanded and more timely State declarations
 - b. Extended access at declared facilities
 - c. Access to locations outside declared facilities
 - d. Unpredictability of verification (surprise inspections)
- 5) Improved analysis of information
 - a. Identify potential sources (e.g. Public sources)
 - b. Identify best analysis practices
 - c. Data storage systems
- 6) Enhanced training
- 7) Proposal that integrates the results of tasks 1-6 above

In opening the discussion, the Chairman characterized GOV/2698 as presenting concrete proposals for the assessment, development and testing of the measures proposed by SAGSI, with a view to achieving a more effective and cost-efficient safeguards system. It explained that the legal implications of proposed measures would be subject to evaluation at a later date and that any measures that went beyond the scope of existing agreements were subject to State approval.

There was an extensive discussion of the planned program (GOV/OR.828 and 829) in December 1993, where Board Members generally welcomed the establishment of Programme 93+2 and appeared satisfied with the scope of the agenda laid out for the program. Most non-nuclear-weapon states comments made only general references to concerns over the costs and legal aspects of the proposed measures, and the hope that they would be applied on a universal scale. The only specific additional suggestion came from France (GOV/OR.829 ¶47), which proposed that, instead of systematic checks, the Agency conduct “spot checks” at closed down facilities and locations containing no nuclear material to verify the accuracy of the information.

The Chairman (GOV/OR.829) summed up the discussion as follows:

...the Board had reiterated its support for strengthening of the Agency's safeguards system and for the Secretariat's efforts and initiatives aimed at increasing the effectiveness and improving the efficiency of that system. Also, the Board was grateful to the Secretariat for the documents which it had provided, the briefings which it had organized and various statements which had been made. Support for the Secretariat's efforts had been demonstrated by further offers of assistance with the planned testing of new techniques. Attention had been drawn to the need for further close consultations and co-operation between the Agency and Member States as work continued. (¶110)

Particular interest had been expressed in the question of measures aimed at enhancing the Agency's ability to confirm the accuracy of declarations through the development of a capability to detect undeclared facilities. Clearly, proposals for new measures in that area touched on sensitive issues and would need to be closely scrutinized. (¶111)

Emphasis had been placed on the importance of the financial aspects of "programme 93+2", and cost-effectiveness would be an important consideration in the evaluation of new proposals. Early steps to reduce costs without loss of effectiveness would be welcome. (¶112)

The need for coherence between the efficiency and effectiveness dimensions of new measures had been reaffirmed. Likewise, the importance of the legal aspects of the programme had been re-emphasized. The legal dimension would have to be borne in mind at all stages. Any new measures would have to be in accordance with existing agreements or freely agreed to by Member States. The relevance of the principle of the equality of States had been reaffirmed. Support had been expressed for the continued involvement of SAGSI. (¶113)

On that basis, the Board had taken note of document GOV/2698. Also, the Board had welcomed the Secretariat's intention to submit regular progress reports to it and provide regular opportunities for it to express its views. The Board trusted that the Secretariat would continue to be sensitive to the concerns expressed by Member States. (¶114)

Thus, Programme 93+2 was given a two-year mandate to evaluate the technical, financial and legal aspects of SAGSI's recommendations. Programme 93 +2 staff consisted of a programme manager, six task officers and representatives from the Legal and External Relations Divisions, who were to develop proposals that were relevant to all four areas covered by SAGSI. The criterion for inclusion of a measure in "Programme 93+2" was that it:

- 1) Reduce the cost of implementing safeguards while maintaining or improving their effectiveness;

- 2) Increase the capabilities of the Agency to detect undeclared nuclear activities;
- 3) Increase the effectiveness and/or efficiency of safeguards through greater cooperation with SSAC's;
- 4) Improve the effectiveness of the acquisition, processing and analysis of safeguards-relevant information;
- 5) Improve inspectors' technical capabilities in the field

Programme 93+2 sought to improve and strengthen safeguards in two phases. The first phase consisted of examining measures that could be implemented with the authority that was already provided by INFCIRC/153. Referred to as "Part 1" measures, these new measures included, inter alia, environmental sampling at declared facilities, commercial satellite imagery analysis, remote monitoring, and evaluation of open-source information.

The second phase consisted of evaluating measures that would require new, specific authorities and consent by individual states, such as expanded access on short or no notice, and multiple-entry visas for inspectors. The conceptual development and assessment of these measures were the subjects of three main progress reports presented in GOV documents: GOV/INF/729; GOV/INF/737; and GOV/INF/759.

6.2 GOV/INF/729- Strengthening the Effectiveness and Improving the Efficiency of the Safeguards System, February 1994

The Board received the first progress report, GOV/INF/729, "*Strengthening the Effectiveness and Improving the Efficiency of the Safeguards System*," 18 Feb 1994. The document gave a brief overview of the seven tasks under which the Programme team was currently working. As the project was still in the early stages of development, the team offered little more than a brief description of the seven tasks, which had been slightly revised since GOV/2698 to include reference to the possible establishment of regional systems of accounting and control:

- Task 1: Cost analysis of present safeguards
- Task 2: Assessment of potential cost savings measures
- Task 3: Environmental monitoring techniques
- Task 4: Increased cooperation with SSAC's (and possible establishment of regional SAC's)
- Task 5: Improved analysis of information on States nuclear activities (e.g. Public sources, intelligence, new databases)
- Task 6: Enhanced safeguards training
- Task 7: Integrated proposal (integrates Tasks 1-6)

Comments were brief and in support of the tasks laid out in GOV/INF/729, with a few Member States stating their general approval of the programme's direction (Japan GOV/OR.834 ¶46; Sweden GOV/OR.834 ¶55; Turkey GOV/OR.834 ¶66) or

volunteering to participate in field trials (Republic of Korea 834 ¶42). Comments are recorded in GOV/OR.834-835.

6.3 GOV/INF/737 - The Secretariat's Development Programme for a Strengthened and More Cost-Effective Safeguards System May, 1994

Progress in Programme 93+2 was presented in GOV/INF/737, *The Secretariat's Development Programme for a Strengthened and More Cost-Effective Safeguards System: A progress report by the Director General*, 12 May 1994. The document continued to follow the seven tasks under which the work had been divided. Tasks 1 and 2 gave an updated assessment of the costs associated with existing and proposed safeguards measures and pointed to potential cost saving areas (primarily staff, travel and equipment-related). Under Task 3 the programme continued to evaluate the technical and financial feasibility of environmental sampling and provided detail on the field tests underway.

Task 4 discussed progress on measures to make states' nuclear activities as "transparent" as possible. It explained its efforts to develop a working paper on a "model expanded declaration" that would involve providing the Agency with more comprehensive access to information and locations. This Task also examined the potential benefits of increased cooperation with States Systems for Accounting and Control, and briefly mentioned that the value of establishing regional safeguards systems was being explored.

Programme 93+2 also introduced a new concept under Task 5, which focused on the analysis of information available to the Agency. The team examined ways to improve the reporting scheme on imports and exports of nuclear material, non-nuclear material and specified equipment. The document described ongoing efforts to identify and define all known pathways for the production of weapons usable material and subsequent weaponization. It provided a visualization of what it called a "Diversion Critical Path" in a chart that diagramed a series of potential proliferation paths (GOV/INF/737 ¶44).

Under Task 5, Programme 93+2 also identified new ways to evaluate information retrieved from the Secretariat's technical databases to provide a more comprehensive picture of a state's nuclear activities. Of note, this is the first official proposal that refers to including export information on dual-use equipment.

Task 6 described new developments in staff training. The programme awaited the results of Tasks 1-6 in order to integrate them into a comprehensive proposal in Task 7.

Member States' comments were recorded in GOV/OR.840 and GOV/OR.841 and emphasized general concerns over the costs of the measures under review. The technical and legal implications of environmental sampling continued to be questioned (India (GOV/OR.840 ¶56); China (¶105)), as did the merits of establishing regional safeguards offices (India GOV/OR.840 ¶57 and Brazil ¶115).

Efforts by Programme 93+2 to develop alternative sources and evaluation methods for available information received mixed reviews. Germany (GOV/OR.840 ¶51) viewed the

concept of developing a physical model that identified critical proliferation pathways as “interesting.” India (GOV/OR.840 ¶57) said the chart “looked very impressive,” though it sounded a warning about the potential for abuse in using intelligence information from outside sources. France (GOV/OR.840 ¶92-93) criticized the approach for its emphasis on quantity instead of the quality of information provided to the Agency, stating “the collection of the greatest possible amount of data and the feeding of computers would become an end rather than a means.”

The U.S. (GOV/OR.840 ¶141) offered strong support for the program’s intention to develop an expanded declaration and assumed it would include dual-use items such as advanced laser research, high explosives development and testing and advanced materials research. The U.S. was of the view that:

if greater transparency was to lead to greater confidence in the non-existence of clandestine activities, those dual-use technologies around which clandestine programs could most easily be developed should be covered.

For the most part, Member States welcomed the progress made thus far in Programme 93+2, but preferred to reserve their final judgments until the conceptual ideas under examination were further developed.

6.4 GOV/INF/759 - Strengthening the Effectiveness and Improving the Efficiency of the Safeguards System, November 1994

Programme 93+2 presented its final progress report, GOV/INF/759, *Strengthening the Effectiveness and Improving the Efficiency of the Safeguards System: A report by the Director General*, 23 November 1994. The document discussed further progress in the seven aforementioned tasks, focusing in detail on field trial experiences and an updated diagram of what was now called the “Proliferation Critical Path.” GOV/INF/759 included specific reference to dual-use equipment in its list of possible proliferation indicators to evaluate under this method.

Worth mentioning, there was an additional change from GOV/INF/737 with respect to the proposed expanded declaration. Task 4 now considered the inclusion of state reporting on and facilitated access to “industrial, commercial and military installations in the immediate vicinity of nuclear installations” (GOV/INF/759 ¶45 and ¶47).

The document was discussed at the December 1994 Board, where several Member States made typical comments regarding costs and expressed support for sections of the document that would address the issue. For example, under Task 2 of GOV/INF/759, Programme 93+2 continued to propose procedural and administrative reforms that had the potential to reduce costs, including more efficient use of staff, equipment, technology and travel. The document also continued to consider the idea of setting up additional regional safeguards offices as a method to further reduce costs.

The proposal was well-received by India (GOV/OR. 855 ¶109) and Mexico, who further suggested that the Agency establish such regional offices in countries that had low costs of living standards and in areas that were close to inspection locations (GOV/OR. 855 ¶119). Germany (GOV/OR.855 ¶129), supported by Egypt (GOV/OR.855 ¶139) and Romania (GOV/OR. 856 ¶67), proposed using support staff as inspectors, suggesting that it would help the staff “better understand the problems encountered in the field”.

Member States continued to comment on the legal implications of additional measures. China (GOV/OR.855 ¶142), among others, was disappointed that, in what was to be the last progress report on 93+2, significant questions remained regarding the results of field trials. Canada remained unsure of the legal basis of enhanced access to information and facilities, despite its ongoing participation in field trials (GOV/OR. 855 ¶148).

Of note, very little was said with respect to the programme’s proposals regarding additional data elements in the expanded declaration. No Member State mentioned the documents newly introduced proposal regarding inclusion of reporting on and the facilitation of access to industrial, commercial and military installations in the immediate vicinity of nuclear installations. The only reference to the proliferation critical path analysis proposal (which had been substantially updated from GOV/INF/737) came from Japan (GOV/OR.855 ¶158), which offered its support for the proposed methodology.

6.5 GOV/2784 - Strengthening the Effectiveness and Improving the Efficiency of the Safeguards System, February 1995

The Director General submitted a progress report on Programme 93+2 to the Board, GOV/2784, *Strengthening the Effectiveness and Improving the Efficiency of the Safeguards System, A Report by the Director General*, 21 February 1995, which provided an integrated document covering the technical, legal and financial aspects of specific measures developed under Programme 93 + 2. The document described, and further elaborated on the legal basis and costs of three specific elements under study: an Expanded Declaration; collection of information through environmental monitoring; and improved analysis of all sources of information made available to the agency. The Expanded Declaration called for enhanced cooperation with the SSACs, information on past and present status of closed down or decommissioned facilities, and additional information concerning the nuclear fuel cycle and planned R&D activities as described in 2(c) Annex II of GOV/2784.

GOV/2784 described efforts by Programme 93+2 to explore the potential benefits of short-range environmental monitoring. It provided the status and time-table for field trials taking place in 12 countries, and in specialized laboratories set up to examine the results. The document concluded that short-range environmental sampling could be a powerful tool for assuring the absence of undeclared activities at or near a nuclear site. It did not draw any final conclusions with respect to the technical feasibility of or legal basis for the technique at longer distances, such as use on public lands or locations not on the Expanded Declaration.

GOV/2784 encouraged the use of information from all sources available to the Agency including open source material such as media and scientific publications, the Secretariat's technical databases, as well as "other information." The document also recommended using the critical pathways methodology described in GOV/INF/737 and GOV/INF/759. Though not specifically mentioned in the text of GOV/2784, reference was made in Annex II to information on the nature of commercial, industrial or military activities at or near nuclear facilities, LOFs or R&D activities, also a continuance from GOV/INF/759.

Gov/2784 also described broad physical access rights to be afforded the Agency, which extended access beyond existing strategic points on the sites of safeguarded facilities to:

- 1) Any location on the site containing the facility;
- 2) Other sites declared in the Expanded Declaration; and
- 3) Locations of interest to the Agency that were not in the Expanded Declaration.

It further described the value of conducting no-notice inspections at the aforementioned locations.

GOV/2784 also explained where existing legal authority under INFCIRC/153 would apply and identified where additional legal authority would be required. For example, the Agency had a right to receive information on R&D that was carried out at a "facility" as defined in paragraph 106 of INFCIRC/153, however, the document acknowledged that additional legal authority would be required for information on the nature of commercial, industrial or military undertakings near sites containing nuclear facilities, LOFs or R&D activities 2.c(iv). Complementary authority would also be needed for information on domestic manufacturers of major items of nuclear equipment or materials 2.c(viii).

The legal basis for environmental monitoring was found in paragraph 74(d) and 74(e) of INFCIRC/153, which pertains to the Agency's rights to conduct surveillance measures and use "other objective methods which have been demonstrated to be technically feasible", both of which pertained to the technique.

There was no legal precedent for environmental monitoring of public lands and locations elsewhere in the state that were not part of the Expanded Declaration. (Nor did the document make a specific endorsement in this regard.) In terms of physical access, INFCIRC/153 provided the Agency access to any location on a site. However, the document determined that complementary access would be necessary at other sites declared in the Expanded Declaration, as well as at locations of interest to the Agency that were not in the Expanded Declaration.

The proposed Expanded Declaration laid out in GOV/2784, Annex II is below:

- 1) Information on the State or regional system of accounting and control (hereafter referred to as SSAC):
 - a. A completed SSAC questionnaire concerning administrative, legal and technical aspects of the SSAC;

- b. The scope and timing of SSAC inspections and other related activities;
- 2) Present nuclear activities:
- a. Information on past nuclear activities relevant to assessing the completeness and correctness of the State's declarations of present nuclear activities:
 - (i) Information on the nature, purpose and design of nuclear activities and facilities which had been closed down or decommissioned prior to entry into force of the Safeguards Agreement;
 - (ii) Historical accounting and operating records predating the entry into force of the Safeguards Agreement.
 - b. Information presently provided:
 - (i) Design information and modifications thereto, including closed-down and decommissioned facilities;
 - (ii) Accounting and operating records;
 - (iii) Accounting and special reports;
 - (iv) Operational programme
 - c. Information not presently provided:
 - (i) Description of the national nuclear fuel cycle and other activities involving nuclear material, with a list of the sites involved;
 - (ii) A description of nuclear research and development (R&D) activities at nuclear facilities and other locations containing nuclear material (LOFs), at nuclear training institutes, at R&D centers, at universities, and elsewhere;
 - (iii) Information, to be agreed with the State, on operational activities additional to that provided under 2.b.(iv) above;
 - (iv) Information on the nature of each of the buildings on the sites on which are located nuclear facilities, LOFs or nuclear R&D activities, including maps of sites;
 - (v) Information on the nature of any other location directly related to the operation of nuclear facilities, LOFs, or R&D activities;
 - (vi) Information on the nature of commercial, industrial or military undertakings in the vicinity of such sites containing nuclear facilities, LOFs or R&D activities;
 - (vii) Location and status of known uranium ore deposits and mines'
 - (viii) Domestic manufacturers, where known, of major items of nuclear equipment or materials for the nuclear activities specified in 2.c. (i) above, or for other States;

- (ix) Information identified in GOV/2629 (“Strengthening the Effectiveness and Improving the Efficiency of the Safeguards System (GCXXXVI)/RES/586): Universal reporting system on nuclear material and specified equipment and non-nuclear material”).
- 3) Planned nuclear activities:
- a. Early provision of design information;
 - b. Plans for the further development of the national fuel cycle;
 - c. A description of planned nuclear R&D activities.

There was general consensus among Member States at the March 1995 Board that the document required further elaboration, especially for such terms as “the national nuclear fuel cycle” and nuclear R&D activities. Regarding access to and information on locations in the vicinity of sites containing nuclear material, it is interesting to note that no specific comments were made—whether in support or opposition—to the proposal for information on the nature of commercial, industrial or military undertakings. Nor were comments made about the proposal to utilize the critical pathways methodology and subsequent information on dual-use items for indicators of weaponization.

Instead, Board comments were particularly focused on the overarching legal basis for the envisaged measures. Sudan (GOV/OR.860 ¶¶94-95), speaking for the Group of 77, noted that a number of measures in document GOV/2784 went beyond existing arrangements and required complementary authority and advocated further deliberations to define appropriate legal arrangements. Egypt (GOV/OR.861 ¶¶86-87) said that for legal reasons a restrictive approach should be preferred in interpreting safeguards agreements. France (GOV/OR.861 ¶27), speaking for the European Union, said that the new measures that went beyond those foreseen by safeguards agreements would require an additional, explicit and voluntary commitment on the part of the States concerned.

The Board also had to determine whether those measures could be put into practice without formal amendments either to INFCIRC/153 or to the safeguards agreements based on it. If agreement were reached, it might take the form of an interpretative declaration made by the Board or the General Conference (GOV/OR.862 ¶¶13-16). The Secretariat replied that the Board could opt to interpret the Agency's Statute and document INFCIRC/153 liberally, but the Secretariat should not read more authority into agreements than was clearly implied. Prudence was called for in interpreting safeguards agreements that unlike INFCIRC/153 were bilateral instruments and thus not open to interpretation exclusively by the Agency.

The Secretariat pointed out that there was nothing to prevent States from permitting, on a voluntary basis, the application of additional measures, but there was a need for something more stable than voluntary permission, which States could withdraw. The Agency would need additional authority based on a further legal instrument to be concluded with each state (GOV/OR.862 ¶¶54-60). The chairman summarized that the Board endorsed the general direction of Programme 93+2, while not at this stage taking a decision on any of the specific measures or on their legal basis (GOV/OR.864 ¶49).

The document requested that the Board confirm a set of key principles:

- A) The purpose of comprehensive safeguards agreements is the continuing verification of the correctness and completeness of State's declarations of nuclear material in order to provide maximum assurance of the non-diversion of nuclear material from declared activities and of the absence of undeclared nuclear activities;
- B) The safeguards system of the IAEA should be so designed as to give effect to that purpose. The IAEA should be enabled to fulfill its mandate under such agreements, either on the basis of existing authority provided for under such agreements or on the basis of complementary authority to be conferred.
- C) An increased access to safeguards-relevant information and safeguards-relevant sites is of key importance to the realization of a more effective and efficient safeguards system;
- D) Under comprehensive safeguards agreements, the States parties and the Agency have an obligation to co-operate fully to achieve effective implementation of the agreements. The Agency must fully perform its part of the cooperation. Similarly, the States Parties must take administrative and other measures to enable the Agency to fulfill its responsibilities under these agreements.

The Board endorsed the key points made in A and B above, as follows:

The Board reiterates that the purpose of comprehensive safeguards agreements, where safeguards are applied to all nuclear material in all nuclear activities within the territory of a State party to such an agreement, under its jurisdiction or carried out under its control anywhere, is to verify that such material is not diverted to nuclear weapons or other nuclear explosive devices. To this end, the safeguards system for implementing comprehensive safeguards agreements should be designed to provide for verification by the Agency of the correctness and completeness of States' declarations, so that there is credible assurance of the non-diversion of nuclear material from declared activities and of the absence of undeclared nuclear activities. (GOV/OR.864)

It also supported C and D by recognizing that “under comprehensive safeguards agreements the States parties and the Agency have an obligation to co-operate fully in achieving effective implementation of the agreements; and that “a strengthened safeguards system will benefit from technological developments and call for greater access to relevant information and, not without noting some reservations, “greater physical access to relevant sites for the Agency.” Importantly, the Board “endorse[d] the general direction of Programme 93+2 for a strengthened and cost-effective safeguards system.”

Much of what was proposed in GOV/2784 carried over into the Model Protocol itself, including, for example the general format for broadened access, which started with access to any location at a facility and the site of a facility, thus eliminating constraints that had hampered the IAEA in Iraq, moving to other locations declared by the state related to nuclear activities, and then elsewhere.

6.6 GOV/2807 - Strengthening the Effectiveness and Improving the Efficiency of the Safeguards System, May 1995

In response to comments and requests made by Member States regarding legal clarification, as well as results from field trials, the Secretariat submitted a revised version of proposals in GOV/2807 of 12 May 1995 *Strengthening the Effectiveness and Improving the Efficiency of the Safeguards System: Proposals for a Strengthened and More Efficient Safeguards System: A Report by the Director General*.

It explained that the Secretariat had prepared a document consisting of two parts. Part 1 consisted of those measures which could be implemented under existing legal authority and which it would be practical and useful to implement at an early date. Part 2 consisted of those measures that the Secretariat proposed for implementation on the basis of the granting of complementary authority. It categorized each proposal in a compendium table (Table 1). It further provided a revised Expanded Declaration in an annex to the document.

For the most part, measures laid out in GOV/2807 coincided with those put forth in GOV/2784. There were a few noticeable exceptions, however. The revised Expanded Declaration now omitted reference to information on the nature of commercial, industrial or military undertakings near sites containing nuclear facilities, LOFs or R&D activities, which was in 2.c(vi) of GOV/2784. It also dropped reference to a description of nuclear R&D at universities that was in 2.c(ii) of GOV/2784.

Another notable omission was language regarding weaponization and the identification of “critical proliferation paths” based on information on dual-use equipment, first proposed in GOV/INF/737, and reintroduced in both GOV/INF/759 and GOV/2784. Though there was an indirect reference in Paragraph 22 to “information to identify at an early stage any instance where the available information might suggest the conduct of activities inconsistent with the State’s declarations.”

Member States generally endorsed the measures laid out in GOV/2807 in comments at the June 1995 Board. However, a few issues continued to stand out. G-77 States spoke of the need for universality and wanted assurance that the proposed measures would not rob developing states of technical cooperation assistance (Sudan (GOV/OR.871 ¶16); Thailand ¶10; Indonesia ¶15; Egypt ¶29; Tunisia ¶72). Japan (GOV/OR. 871 ¶24) also called for universal application, and requested further clarification of environmental sampling procedures and access to non-nuclear activities (¶18 and ¶20).

Not surprisingly, Pakistan (GOV/OR. 871 ¶42) reminded the Board that the focus of their efforts was limited to improving measures only within states with comprehensive safeguards agreements.

Brazil (GOV/OR.870 para ¶21) intervened with a very practical concern regarding the provision of information on domestic manufacturers (2.c.(vii) of the revised Expanded Declaration), stating that “there was one installation in Brazil which purchased equipment from at least a hundred private companies engaged also in many non-nuclear areas of industrial activity and, if...the Agency should have access to all locations identified in Expanded Declarations, all those companies would be liable to inspection. Such a situation would obviously not be acceptable to any country.”

The Secretariat (GOV/OR.871 ¶125) responded by assuring States that “it was not anticipated that access would be requested to the premises of domestic manufacturers of specific items of equipment.” It is interesting to note that the Secretariat had made a similar pledge regarding the unlikelihood of special inspections in GOV/2554. Again, it is unclear if the assurance was based on the assumption that domestic manufacturers were unlikely to commit violations, or whether it was expected that even when there was a need to investigate potential violations, the authority to access to such locations would rarely be invoked. In both cases it sets the bar high for Agency access, and leaves open the possibility that lax implementation might reoccur.

Although not explicitly mentioned in GOV/2807, the Secretariat informed the Board that the critical proliferation pathways methodology was still under development in Programme 93+2 (GOV/OR.871 ¶124). This is important in that this methodology would play a critical role in determining the specific equipment and activities included in draft protocol language in subsequent GOV/ documents.

Following consideration by the June 1995 Board, the Secretariat (GOV/OR.872 ¶9) recommended that the Board accept the recommendation put forth in paragraph 6 of GOV/2807:

It is recommended that the Board take note of the Director General's plan to implement at an early date the measures described in Part I and that it urge States party to comprehensive safeguards agreements to co-operate with Secretariat to facilitate such implementation

It was so agreed.

6.7 Discussion Draft of 21 November, 1995

Between the June and December 1995 Board of Governors meetings the Secretariat conducted informal consultations with Member States, as well as took advice from SAGSI to further develop the proposals under consideration. The proposals were presented to the December Board in the form of the informal “Discussion Draft” of 21 November 1995.

Annex III of this document was the first draft of an Additional Protocol, which was meant to be a new legal instrument that would grant the Agency new legal authority. In it were a few additions to the measures proposed in GOV/2807. This included a nuanced picture in article 1.a.vi (a.-c.) of material containing uranium or thorium, which pursuant to Paragraph 34(c), had not yet reached the composition and purity suitable for fuel fabrication. It also included information on high-level waste containing enriched uranium or plutonium on which safeguards had been terminated.

Of particular interest, with respect to specified nuclear equipment and non-nuclear material and specified nuclear-related dual-use equipment and material, the proposed draft Additional Protocol now included information about export license approvals and where available, information on actual exports and imports of such equipment and material (Article 1.ix(a-b)).

Member States provided comments at the December 1995 Board. Member States' statements were generally supportive in nature, acknowledging that this was an informal document and that a more formal document was to be presented shortly. Although the Secretariat's draft did not specify the basis for seeking complementary access, several non-nuclear weapon states suggested that it should only be available in order to resolve a question or inconsistency.

6.8 GOV/2863: Strengthening the Effectiveness and Improving the Efficiency of the Safeguards System, Proposals for implementation under complementary legal authority: A Report by the Director General, June 1996

In June, 1996, the Director General submitted to the Board GOV/2863, *Strengthening the Effectiveness and Improving the Efficiency of the Safeguards System, Proposals for implementation under complementary legal authority: A report by the Director General*. This was to be his final report prior to the initiation of negotiations on what would emerge as the Model Additional Protocol. GOV/2863 continued to take account of comments and proposals put forward to improve Agency access to information on a wide range of activities associated with states' nuclear programs and to relevant locations. The proposed measures were described in general detail in Parts A and B of GOV/2863. Annex II of the document offered further definition and rationale for the proposed content of a revised Expanded Declaration. GOV/2863 also included a table with a compendium of "strengthening" measures, some of which could be implemented under existing authority and some that required complementary legal authority. This table is reproduced in Annex 3 below.

GOV/2863 did not make explicit specific reference to dual-use items; however the intention to utilize such information was implied on several occasions. For example, the physical model referenced in Annex II had been described in GOV/2784 as including dual-use technologies in the development of the model. Additionally, Part 2. (ix) in GOV/2863 Annex II explained that the safeguards system might benefit from

“information on the export and import of other selected equipment and non-nuclear material that are not included in GOV/2629, as amended.”²¹ It also stated the intention to “leave open the possibility, at some later point in time, for the Secretariat to propose to the Board a limited number of such items whose reporting would be beneficial as well as practical and for the Board to include such items as it deems appropriate.” Further, the list of items defined in Article 16 of Annex III included at least three items that had dual-use applications, namely, beryllium, boron-10 and, tritium.

Member States’ views regarding the proposals in GOV/2863 were expressed during the June 1996 Board, where it appears that the same measures provoked the same type of comments.

Universality

Non-discriminatory and universal application of safeguards practices remained at the forefront of the debate for non-nuclear-weapon states. While not going as far as many non-nuclear-weapon states wished, GOV/2863, itself, noted that:

... the overall safeguards system would be further enhanced if, in addition to acceptance of the protocol by States with comprehensive safeguards agreements, other States would be prepared to undertake legally binding commitments with regard to the application of “Programme 93+2” measures relevant to strengthening safeguards in those States. The Secretariat would, if directed by the Board, develop a draft legal instrument for this purpose.

For example, while expressing general support for progress made in 93+2, Morocco (GOV/OR.892 ¶60), speaking on behalf of the African Group, insisted on including both nuclear-weapon states and INFCIRC/66 states. Algeria (GOV/OR.894 ¶52) levied a stronger criticism, saying it appeared that “the developing would once again bear the brunt of the new constraints.” Japan (GOV/OR.894 ¶143) pressed for the Secretariat to produce a legal document that required all states to share equal responsibility for strengthening the safeguards system. Italy (GOV/OR.894 ¶67), speaking on behalf of the European Union, and associated countries, issued a statement expressing its desire for universal application of safeguards, welcoming discussions with the nuclear-weapon States and encouraging contributions that other states without comprehensive safeguards were willing to make.

Egypt, South Korea, Australia, Romania, Kuwait, Mexico, Nigeria, Argentina, Libya, New Zealand and Spain made similar comments with respect to universality. Indeed, there were only four Member States--Canada, Saudi Arabia, Thailand and Uruguay--out of the twenty-eight Board members and four non-Member States that participated in the discussion that did not make some reference to universality.

²¹ GOV/2629 was the Secretariat’s proposal for universal reporting of certain exports and imports.

Brazil (GOV/OR.894 ¶82) made the only specific proposal regarding universality, suggesting that, in order to avoid discrimination, the protocol should not come into force until 50 or 60 had been concluded.

All of the NWS responded to non-nuclear-weapon states views regarding universality. France, the UK, and the U.S., citing consultations with other NWS, all made a similar commitment to accept, at facilities designated by the Agency for inspection under their voluntary offer safeguards agreements, the application of measures specified in document GOV/2863 that were mutually agreed would improve the effectiveness and efficiency of safeguards applied under the agreement. (U.S. GOV/OR.894 ¶41-43), UK (GOV/OR.895 ¶38), France (GOV/OR.895 ¶59).

Russia expressed its willingness to consider such implementation in connection with its voluntary offer safeguards agreement (GOV/OR.895 ¶45). But China (GOV/OR.895 ¶25) which shared similar views with INFCIRC/66 states rejected the notion of expanding the applicability of 93+2 measures to states other than those with comprehensive safeguards agreements. China did, however, mention that it was willing to make some contributions and pointed to its adherence to the voluntary reporting scheme as evidence.

On the other hand, India and Pakistan balked at any such suggestion, stating respectively that,

A number of delegations had suggested that the scope of Programme 93+2 be extended to cover countries which had not concluded comprehensive safeguards agreements with the Agency. That idea was not acceptable to India, as such an extension of scope had no basis in law and would clearly be impracticable. India could therefore not agree that a legal document should be prepared in furtherance of that idea. (GOV/OR.895 ¶53)

In conclusion, he said his delegation [Pakistan] took strong exception to the suggestion - made in paragraph 16 of document GOV/2863 - that the scope of Programme 93+2 be extended to include countries having voluntary-offer and item-specific safeguards agreements with the Agency. (GOV/OR.895 ¶70)

Israel, citing Programme 93+2's goal of improving detection of undeclared nuclear material and activities, commended the objective, observed how difficult this was in Iraq, and noted that that goal was legally extraneous to safeguards implemented pursuant to INFCIRC/66-type agreements. (GOV/OR.895 ¶96-98)

Access

Issues pertaining to enhanced access to information and locations continued to plague the debate. Japan (GOV/OR.894 ¶145) wanted to exempt safety research. Algeria (GOV/OR.894 ¶50) considered the information requested unjustified and the access

requests an attempt to adopt routine procedures for exceptional measures. It wanted further explanation of the type of information required on R&D not involving nuclear material, isotope production, exports and imports of specified equipment, and the locations of mines and ore deposits.

Brazil (GOV/OR.894 ¶84-92) launched into a wide range of criticisms. It contended that Annex III lacked specificity in terms of the definitions of R&D, and requested further specifics on the definition of sites, data on specified equipment, information requirements for planned activities and information on nuclear material before the established starting point of safeguards. It also opposed the proposal for access to resolve questions and stated that access should be restricted to inconsistencies. (A view supported by China (GOV/OR.895 ¶29)). It also said that access should exclude records examination and other procedural and technical tools such as simplified inspector designation procedures and wide-area monitoring, which it considered to be too much like special inspections.

Italy (GOV/OR.894 ¶70), speaking on behalf of the European Union put forward two specific proposals with respect to access to locations and information: 1) a 24-hour notice requirement on all complementary access; and 2) the need for a specific amendment to the Additional Protocol should there be items added to the list of equipment reported.

Protecting confidentiality continued to be an issue of concern for developing states. Egypt (GOV/OR.894 ¶102) wanted to limit access to non-nuclear R&D; Mexico (GOV/OR.895 ¶11) suggested requests be limited to “information where available.”

Canada (GOV/OR.894 ¶60) and New Zealand (GOV/OR.895 ¶93) defended strengthened safeguards as good for industry, providing confidence, efficiency and a secure environment for trade. As a compromise formulation, Australia (GOV/OR.894 ¶117) and Japan (GOV/OR.894 ¶145) both proposed including a recognition that states had only limited authority over nuclear activities within the state but that they use “all reasonable efforts [endeavors]” to report on activities not under control by the state.

Cost concerns remained a general issue for G-77 states. China (GOV/OR.895 ¶26) also made remarks about limiting excessive costs. In that respect, China proposed phasing out old measures as new measures were introduced.

It is interesting to note that few if any comments were made with respect to the new proposed measures for enhanced information on uranium and thorium reporting as well as information on waste. With respect to dual-use reporting, Switzerland made the only specific comment. It suggested that the list of items be restricted to NSG items and the reporting limited to exports to countries of proliferation concern.

The U.S. (GOV/OR.894 ¶36) expressed its frustration with the slow pace at which the process was progressing. The U.S. pointed out that the issues had been examined by SAGSI, the Board, and in intensive consultations in Vienna and among capitals for over five years and insisted that the time was ripe for Board Members to come to a consensus and to approve and adopt the measures articulated in Annex III of GOV/2863. The U.S. position was overshadowed, however, by a wide variety of persistent concerns that

Member States felt could only be resolved by the introduction of a legal instrument to be created by a committee of experts on the subject.

After twelve hours of debate spanning two days of discussions of GOV/2863, the Chairman stated and the Board agreed to establish a committee with the task of drafting the model protocol basing itself on Annex III to document GOV/2863. It invited all Member States legally obliged to conclude a comprehensive safeguards agreement to participate, and welcomed any related intergovernmental organization to take part as an observer.

7. SUMMARY

Events in Iraq and North Korea highlighted shortcomings in the INFCIRC/153 safeguards system. These made it evident to the Agency and Member States that significant improvements were needed to respond adequately to challenges in the future. The principal objective was to strengthen the Agency's ability to detect undeclared nuclear material and activities, and the principle means was to provide the IAEA with enhanced access to information and to locations and to provide it with the necessary authorities. Contemporaneous events in South Africa had highlighted what was required to draw conclusions about States' activities that had been undeclared and had given the IAEA on-the-ground experience in verifying their elimination.

In this context, from 1991 until June 1996, the Secretariat and the IAEA Board of Governors engaged in an extensive effort to develop the measures needed to strengthen the safeguard system, keeping in mind Member States' need to protect their legitimate interests and to respect constitutional obligations. Efforts were recorded in a series of documents containing a wide range of proposals that called for providing the Agency with additional information and increased physical access to nuclear-related activities within a state.

Some measures or principals were accepted early in the process, especially those that could be pursued within existing IAEA authority. For example, the Board recognized and affirmed the authority of the IAEA to conduct special inspections (though that right was tempered by the expectation that it would rarely be invoked). The Board also approved the Agency's right to the early provision of facility design information. A voluntary, universal reporting scheme for exports was also adopted by the Board based on a Nuclear Suppliers Group list.

Other measures were proposed that would require complementary authority to implement. These measures included such provisions as access to private sector activities, to nuclear R&D not including nuclear material, and to pre-34.(c) material and exempted nuclear material.

At the same time, agreement on other more overarching issues remained elusive. Cost was a big concern to G-77 states in particular. They consistently worried that the addition of new measures would come at the expense of technical assistance to developing countries. Member States from across the board expressed their regret that little more than estimates could be provided at this stage of the process.

The issue of universality was another major issue. Non-nuclear-weapon states with extensive civilian nuclear industries, as well as developing G-77 states, criticized the discriminatory nature of the measures being proposed, citing their inapplicability to both nuclear-weapon states and states with INFCIRC/66 type agreements. They consistently expressed the view that in order to strengthen the Agency's capability to detect undeclared nuclear material and activities in an effective manner and increase the efficiency of the safeguards program, co-operation was needed from all States.

In that connection, nuclear-weapon States indicated a willingness to consider how best to contribute to the implementation of Programme 93+2. Members with INFCIRC/66-type

agreements were less amenable and persisted in their view that any extension of the proposed measures to States with such agreements would go beyond the original purpose of this endeavor and could not be accepted.

Member States had reservations regarding a wide range of provisions and for a broad array of reasons that had been articulated repeatedly throughout the negotiating process. To resolve those issues, most (the U.S. was not among this group) felt it would be necessary to set up an open-ended committee to identify mutually acceptable solutions upon which consensus could be reached. The end result was to be a legal instrument that amended and added to Member States obligations under comprehensive safeguards agreements.

Therefore, the Board decided to establish a committee with the task of drafting a model protocol basing itself on Annex III to document GOV/2863 and taking into account, inter alia, the explanation of the measures contained in that document and the discussions on the matter in the Board. The aim was to develop a model protocol that would provide precise language striking a balance between the concerns of individual States and the need to ensure the efficiency and effectiveness of the measures proposed. The Committee would be presided over by the Chairman of the Board, would commence its work early in July 1996 and would meet as frequently as was necessary in order to ensure progress. It was anticipated that the Committee would be prepared to report to the Board on the outcome of its work by the Board's December 1996 session.

What occurred in the new committee with respect to the major issues that remained to be resolved is the subject taken up in Volume II of this report.

ANNEX 1: KEY DOCUMENTS 1991-1996

1991

November GOV/2554, Strengthening of Agency Safeguards: Special Inspections and the Provision of Design Information, GOV/OR.776,GOV/OR.777

1992

January GOV/2554/Attachment 2/Rev.1, Strengthening of Agency Safeguards: The Provision and Use of Design Information

January GOV/2568, Strengthening of Agency Safeguards: 1. Reporting and Verification of the Export, Import and Production of Nuclear Material for States Party to Comprehensive Safeguards Agreements; and 2. Reporting and Verification of the Export, Import and Production of Sensitive Equipment and Non-Nuclear Material for States Party to Comprehensive Safeguards Agreements, GOV/OR.778

April GOV/2554/Attachment 2/Rev.2, Strengthening of Agency Safeguards: The Provision and Use of Design Information

May GOV/2588, Universal Reporting of Exports, Imports and Inventories of Nuclear Material for Peaceful Purposes

May GOV/2589, Universal Reporting of Exports and Imports of Certain Equipment and Non-Nuclear Material for Peaceful Nuclear Purposes, GOV/OR.787

1993

February GOV/2629, Strengthening the Effectiveness and Improving the Efficiency of the Safeguards System (GC(XXXVI/Res/586): Universal reporting system on nuclear material and specified equipment and non-nuclear material, GOV/OR.802, GOV/OR.803

February GOV/INF/680, The Relevance of Certain Aspects of the Chemical Weapons Convention to Efforts to Strengthen Agency Safeguards

April SAR-15, Report to the Director General on the Thirty-Sixth Series of SAGSI Meetings 19-23 April 1993

- May GOV/2657 of 14 May 1993, Strengthening the Effectiveness and Efficiency of the Safeguards System: Report by the Director General on SAGSI's Re-Examination of Safeguards Implementation, GOV/OR.815, GOV/OR.816
- November GOV/2698, Strengthening the Effectiveness and Improving the Efficiency of the Safeguards System: Report by the Director General on the Secretariat's program for assessment, development and testing of SAGSI's recommendations on the implementation of safeguards." GOV/OR.828, GOV/OR.829
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1994

- February GOV/INF/729, Strengthening the Effectiveness and Improving the Efficiency of the Safeguards System, February 1994 GOV/OR.834 GOV/OR.835
- May GOV/INF/737, The Secretariat's Development Programme for a Strengthened and More Cost-Effective Safeguards System: A progress report by the Director General GOV/OR.840, GOV/OR.841
- November GOV/INF/759, Strengthening the Effectiveness and Improving the Efficiency of the Safeguards System: A report by the Director General, 23 November 1994. GOV/OR.855, GOV/OR.856
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1995

- February GOV/2784, Strengthening the Effectiveness and Improving the Efficiency of the Safeguards System, A Report by the Director General GOV/OR.860, GOV/OR.861, GOV/OR.862, GOV/OR.864
- May GOV/2807, Strengthening the Effectiveness and Improving the Efficiency of the Safeguards System: Proposals for a Strengthened and More Efficient Safeguards System: A Report by the Director General. 12 May 1995, GOV/OR.870, GOV/OR.871, GOV/OR.872, November "Discussion Draft" of 21 November 1995.
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1996

- May Board GOV/2863, Strengthening the Effectiveness and Improving the Efficiency of the Safeguards System, Proposals for implementation under comprehensive legal authority: A report by the Director General. GOV/OR.892, GOV/OR.894, GOV/OR.895

ANNEX 2: GOV/2554/ATTACHMENT 2/REV.2: SUBMISSION OF DESIGN INFORMATION

THE PROVISION AND USE OF DESIGN INFORMATION

1. Parties to comprehensive safeguards agreements are under an obligation to provide design information in respect of existing facilities during the discussion of Subsidiary Arrangements; also, the time limits for the provision of such information on new facilities are required to be specified in Subsidiary Arrangements. Comprehensive safeguards agreements further require that information concerning a new facility be provided as early as possible before nuclear material is introduced into a new facility. The model Subsidiary Arrangements for comprehensive safeguards agreements currently call for the provision of completed Agency Design Information Questionnaires for new facilities normally not later than 180 days before the facilities are scheduled to receive nuclear material for the first time. In practice, this has come to mean that information is provided at any time between 30 and 180 days before nuclear material is introduced into the facility. Experience has shown that the provision of design information is needed much earlier.

2. Parties to comprehensive safeguards agreements will need to provide design information to the Agency at the time of the decision to construct, or to authorize the construction of, any nuclear facility (i.e. well before construction actually begins) in order to create confidence in the peaceful purpose of the facility and to provide adequate lead-time for safeguards preparations - more specifically:
 - a. To facilitate the incorporation into the facility design - including the design of the nuclear materials accountancy system - of features which will make it easier to implement safeguards at the facility (any proposed design modifications being consistent with the prudent management practices required for the economic and safe operation of the facility and such as to avoid hampering or delaying construction, commissioning or operation);
 - b. To allow time for safeguards research and development work that may be necessary;
 - c. To enable the Agency to do the budgetary planning necessary for the effective and efficient implementation of safeguards; and
 - d. To permit the identification and scheduling of actions which need to be taken jointly by the State, the facility operator and the Agency, including (i) the installation of safeguards equipment during construction of the facility; and (ii) the verification of information on the design of the facility.

3. The provision of up-to-date and complete design information on existing facilities is an important confidence-building measure, required in order to ensure that the safeguards applied to them continue to be appropriate. The reporting to the Agency of significant modifications to facilities and the provision and verification of design information during their modification is another important confidence-building measure. The verification of design information provides assurance that no undeclared activities are taking place at the facilities. Under comprehensive safeguards agreements, the Agency's authority to verify design information is a continuing right which does not expire when a facility goes into operation; nor does this continuing right expire with the closing-down of a facility. Visits by Agency inspectors to verify that facilities which have been closed down remain in their closed-down condition are part of design verification and provide assurance that such facilities are not re-activated and used for undeclared activities.
4. Subsidiary Arrangements should provide that parties to comprehensive safeguards agreements make available, on an iterative basis, information on the safeguards-relevant features of facility designs early in the following phases of the planning and construction of new facilities (including imported facilities) and modifications to existing facilities: project definition, preliminary design, construction and commissioning (see para. 5 of document GOV/INF/613/Add.1). In practice, a number of States routinely provide such information in this manner.
5. The information required during the project definition phase will consist of the identification of the facility, and its general character, purpose, nominal capacity and geographic location. Available information on the form, location and flow of nuclear material and on the general layout of important items of equipment which use, produce or process nuclear material should also be provided. More information should be provided as the design is developed during the subsequent preliminary design phase. It is during this phase that alterations can most easily be made to the design so as to make it more safeguards-friendly and/or permit the incorporation of equipment or instrumentation required for safeguards purposes. A completed Design Information Questionnaire based on the preliminary construction plan will be required as early as possible, as and in any event not later than 180 days prior to the start of construction. A completed Design Information Questionnaire based on the "as-built" design will also be required as early as possible, as and in any event not later than 180 days before the first receipt of nuclear material at the facility. The Agency will verify design information through the physical examination of new or modified facilities during the construction, commissioning, operation and subsequent phases.
6. To ensure the early provision of adequate design information on new or modified facilities, it may be necessary to amend existing Subsidiary Arrangements. Parties to comprehensive safeguards agreements should, pending such action:
 - a. Inform the Agency of their programmes for new nuclear facilities and activities and for any modifications to existing facilities through the provision of preliminary design information as soon as the decision to construct, to authorize construction or to modify has been taken; and

- b. Provide the Agency with further information on designs as they are developed. The information should be provided early in the project definition, preliminary design, construction and commissioning phases; and
- c. Provide the Agency with completed Design Information Questionnaires for new facilities based on preliminary construction plans as early as possible, as and in any event not later than 180 days prior to the start of construction. Design Information Questionnaires based on "as-built" designs should be provided as early as possible, as and in any event not later than 180 days before the first receipt of nuclear material at the facility.

RECOMMENDED ACTION BY THE BOARD

7. It is recommended that the Board:

- a. Call upon all parties to comprehensive safeguards agreements to provide the information described in paragraph 6 above; and
- b. Request the Secretariat and all parties to comprehensive safeguards agreements to adapt, where appropriate, the related Subsidiary Arrangements.

ANNEX 3. GOV/2863 ANNEX I – LEGAL EVALUATION OF MEASURES PROPOSED FOR STRENGTHENED AND MORE COST-EFFECTIVE SAFEGUARDS (REFERENCES TO INFCIRC/153 AND GOV/2784)

Category of Measure		Measure (numbered in accordance with the Expanded Declaration in Annex II)	Measures to be implemented under existing legal authority	Measures proposed for implementation under complementary legal authority (with relevant paragraphs in this document)
BROADER ACCESS TO INFORMATION	Expanded Declaration	1. Information on the SSAC	INFCIRC/153 paras. 7, 31, 32, 81(b); GOV/2784 para. 34	
		2.a. Information on past nuclear activities (decommissioned nuclear facilities and existing historical records on production of nuclear material) relevant to assessing the State's declarations of present nuclear activities, including the completeness and correctness of its initial report	INFCIRC/153 paras. 3, 62; GOV/2784 para. 35	
		2.b. Information presently routinely provided: (i) design information and modifications thereto, including closed-down but not decommissioned facilities; (ii) accounting and operating records; (iii) accounting and special reports; and (iv) operational programmes	INFCIRC/153 paras. 42-50 51-58, 59-65, 67-69, 64(b); GOV/2784 para. 34	
		2.c.(i) Description of the nuclear fuel cycle and other nuclear activities involving nuclear material	INFCIRC/153 para. 81(c) GOV/2784 para. 36	

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	2.c.(ii). Description, status and location of nuclear fuel cycle-related R&D (hereinafter referred to as nuclear R&D) activities involving nuclear material at nuclear facilities and other locations containing nuclear material (LOFs)	INFCIRC/153 paras. 42-46, 49; GOV/2784 para. 37	
	2.c.(iii). Description, status and location of nuclear R&D activities owned, funded or authorized by the State, not involving nuclear material, wherever located, and related to specified parts of the fuel cycle and, additionally, all such activities in the State specifically related to enrichment, reprocessing of nuclear fuel and treatment of waste containing nuclear material		(para. 51(a)) GOV/2784 para. 37
	2.c.(iv). Information, as may be agreed with the State, on specified operational activities additional to that required under INFCIRC/153 (see 2.b.(iv) above)		(para. 51(b)) GOV/2784 para. 38
	2.c.(v). Description, contents and use of each building on sites of nuclear facilities or LOFs; upon specific Agency request and based on every reasonable effort by the State, information on activities at locations identified by the Agency outside such site.	In limited cases, depending on the configuration of the facility or LOF INFCIRC/153 paras. 42-46, 49; GOV/2784 para. 39	(para. 51(c)) GOV/2784 para. 39

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	2.c.(vi). Identity, location, description, status, present annual production and approximate annual production capacity for the manufacture, assembly and maintenance of specified items directly related to the operation of nuclear facilities, LOFs or nuclear R&D activities		(para. 51(d)) GOV/2784 para. 39
	2.c.(vii). Location, operational status, present annual production and approximate annual production capacity of uranium and thorium mines		(para. 51(e)) GOV/2784 para. 39
	2.c.(viii). Information on other nuclear material and uranium and thorium containing materials, including pre-INFCIRC/153 para. 34(c) material, some exempted material and some material on which safeguards are terminated	Partially covered by INFCIRC/153 para. 81(c); GOV/2784 para. 36	(para. 51(f)) GOV/2784 para. 39
	2.c.(ix). Import and export information on specified equipment and non-nuclear material specified in GOV/2629 and on such other equipment and non-nuclear material as may be specified by the Board		GOV/2784 para. 40
	3.a. Early provision of design information in accordance with GOV/2554/Attach. 2/ Rev.2	INFCIRC/153 paras. 42, 45, 49; GOV/2784 para. 41	
	3.b. Planned activities owned, funded or authorized by the State for the further development of the nuclear fuel cycle	(para. 52(a))	GOV/2784 para. 41
	3.c. Description of planned nuclear R&D activities owned, funded or authorized by, or otherwise coming to the knowledge of, the State		GOV/2784 para. 41

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	Environmental Sampling	For ad hoc inspections at locations where the initial report or inspections carried out in connection with it indicate that nuclear material is present	INFCIRC/153 paras. 6, 74(d), 74(e), 76(a); GOV/2784 paras. 51-54	
		For routine inspections at strategic points	INFCIRC/153 paras. 6, 74(d), 74(c), 76(c) GOV/2784 paras. 51-54	
		For special inspections at the locations where these take place	INFCIRC/153 paras. 6, 74(d), 74(e), 77; GOV/2784 paras. 51-54	
		For design information verification at any location to which the Agency has access for design information verification	INFCIRC/153 paras. 6, 47, 48; GOV/2784 para. 55	
		During access under complementary legal authority to places and locations identified below under Complementary Access		(para. 53-58) GOV/2784 para. 54
	Improved Analysis of Information	Improvements in the Agency's information analysis methods	INFCIRC/153 paras. 90; GOV/2784 para. 63	
INCREASED PHYSICAL ACCESS	Complementary Access ^{1/}	Access to any place (beyond strategic points) on a site containing a nuclear facility or LOF, including sites with closed-down facilities and LOFs; access to decommissioned facilities and LOFs	INFCIRC/153 paras. 48, 76(a); GOV/2784 paras. 75-76	(paras. 61(a), 62-65) GOV/2784 paras. 74-75
		Access to other locations identified in the Expanded Declaration as containing other nuclear material or material containing U or Th (2.c.(vii) and 2.c.(viii))		(paras. 61(b), 66-67)

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	Access, upon Agency request and taking into account any constitutional obligations of the State regarding proprietary rights or searches and seizures, to locations identified in the Expanded Declaration as containing nuclear R&D (2.c.(iii)) and locations involving specified items directly related to the operation of nuclear facilities, LOFs or nuclear R&D (2.c.(vi))		(paras. 61(c), 68-69) GOV/2784 para. 77	
	Access, upon Agency request, and taking into account any constitutional obligations of the State regarding proprietary rights or searches and seizures, to locations in addition to the above for environmental sampling			
	Access, as the State may choose to offer, in addition to that described above, to any location in the State which the Agency considers may be of safeguards relevance (see paras. 61(e), 71 of this document)			
	No-notice Access	Unannounced (no-notice) routine inspections at strategic points within the sites of nuclear facilities and LOFs	INFCIRC/153 para. 84; GOV12784 para. 86	
		No-notice access <i>to</i> any other place on the site of a nuclear facility or LOF when carried out during a DIV visit or inspection of the facility or LOF		(para. 63) GOV/2784 para 86

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OPTIMAL USE OF THE PRESENT SYSTEM PRESENT SYSTEM	Safeguards Technology Advances	Use of unattended equipment	INFCIRC/153 paras. 6, 74(e), 81(e)	
		Remote transmission of inspection data Remote monitoring of safeguards equipment. Remote monitoring of safeguards equipment	INFCIRC/153 paras. 6,74(e), 81(e) INFCIRC/153 paras. 6, INFCIRC/153 paras. 6, 74(e), 1(e)	
	Advances			
	Increased Co-operation with States and SSACs with States and SSACs	The SSAC carries out activities that enable the Agency to conduct inspection activities	INFCIRC/153 paras. 3, 7, 31, 81(b)	
		The Agency and the SSAC may carry out selected inspection activities jointly	INFCIRC/153 paras. 3, 31	
		The Agency and the SAC may carry out selected support activities jointly	INFCIRC/153 paras. 3, 31	
		Use of simplified procedures for the designation of inspectors		(paras. 72-72) GOV/2784 para. 102 GOV/2807 para. 54
		Multiple-entry visa, long-term visa or visaless entry for inspectors on inspection	Necessary for unannounced routine inspections INFCIRC/153 paras. 84, 86 GOV/2784 para. 86	
		Use of systems for independent direct communication (including satellite systems) between the field and Headquarters	In States where such systems are available INFCIRC/153 paras. 3, 88	In States where such systems are not available (paras. 72-73) GOV/2784 para. 102 GOV/2807 para. 54
	Safeguards Parameters	Significant quantities of nuclear material	INFCIRC/153 para. 28	
		Conversion/detection times	INFCIRC/153 para. 28	

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	Starting point of safeguards	INFCIRC/153 para. 34(c)	

^{1/} These proposals are not intended to affect the Agency's right to implement special inspections.