

SUB-THESIS SUBMITTED IN
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THE APPLICATION OF SAFEGUARDS IN CONNECTION WITH THE
TREATY ON THE NON-PROLIFERATION OF NUCLEAR WEAPONS IN
THE NON-NUCLEAR-WEAPON STATES OF THE EUROPEAN ATOMIC
ENERGY COMMUNITY (EURATOM) PURSUANT TO THE AGREEMENT
AMONG THE EURATOM NON-NUCLEAR-WEAPON STATES, EURATOM
AND THE INTERNATIONAL ATOMIC ENERGY AGENCY

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This thesis is my own work and all sources
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TABLE OF CONTENTS

	<u>Page</u>
INTRODUCTION	1
Definition of safeguards	2
REQUIREMENTS OF NPT	5
IAEA SAFEGUARDS	9
IAEA Safeguards pre-NPT	9
Features of safeguards prescribed by the IAEA Statute	13
Design information	13
Health and safety	14
Records and reports	15
Continuation of safeguards	15
Deposit of special fissionable material	16
Inspectors and inspections	16
Sanctions	17
Safeguarding of IAEA activities	19
Development of the IAEA's safeguards system	19
The Inspectors Document	21
A post-NPT development	21
Applicability of non-NPT safeguards to the nuclear fuel cycle	23
IAEA NPT Safeguards	24
Objective of NPT safeguards and the IAEA Statute	24
Safeguards on all peaceful nuclear activities	27
The role of the IAEA as a non-party to the NPT	28
Further development of IAEA safeguards in connection with NPT	29
Modification of an NPT requirement	30
IAEA rights in relation to undeclared items	33
Safeguards and non-proscribed military activities	38
Other features of INFCIRC/153	39
State system of accounting for and control of nuclear material	40
Provision of information to the IAEA	41
IAEA inspectors	41
Privileges and immunities of the IAEA	42
Termination of safeguards	42
Third Party liability and international responsibility	43
Objective of IAEA NPT safeguards	44
Containment and surveillance	46
Material accountancy	46
IAEA inspections	47

	<u>Page</u>
Import and export of nuclear material	49
Subsidiary Arrangements	52
 EURATOM SAFEGUARDS	 52
Euratom	53
Supply and property ownership	54
Objective of Euratom safeguards	55
Features of safeguards prescribed by the Euratom Treaty	57
Design information	57
Records and reports	58
Deposit of special fissile materials	58
Inspectors and inspections	59
Sanctions	60
Differences in objectives of Euratom and IAEA safeguards	62
A supra-national safeguards system	63
 EURATOM/IAEA SAFEGUARDS AGREEMENT	 64
Role of IAEA and of Euratom under the Agreement	65
Euratom safeguards as a system of accounting for and control of nuclear material	67
Co-operation between IAEA and Euratom	68
Provision of design information to IAEA	70
Subsidiary Arrangements	71
Records and reports requirements	71
Import and export of nuclear material	72
Inspections	73
Routine inspection activities of IAEA and Euratom	73
Co-ordination of routine inspection effort	76
Ad hoc inspections	80
Liaison Committee	80
Euratom action to implement the Agreement	81
Distinguishing features of the Agreement	82
 A MODEL FOR AGREEMENTS WITH OTHER STATES?	 86
The Japan Agreement and the Euratom Agreement compared	86
The Japan and Euratom Protocols compared	88
Concurrence of provisions regarding information, reports and inspections	89
The Japanese national system and independent verification	90
 CONCLUSION	 94
 FOOTNOTES	 96

INTRODUCTION

Safeguards in connection with the Treaty on the Non-Proliferation of Nuclear Weapons ("the NPT")¹ are applied by the International Atomic Energy Agency ("the IAEA") in the non-nuclear-weapon States ("NNWS") of the European Atomic Energy Community ("Euratom") pursuant to the Agreement between Belgium, Denmark, the Federal Republic of Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, the European Atomic Energy Community and the International Atomic Energy Agency in Implementation of Article III, (1) and (4) of the Treaty on the Non-Proliferation of Nuclear Weapons ("the Euratom/IAEA Safeguards Agreement").^{1a} An appreciation of the application of safeguards pursuant to the Euratom/IAEA Safeguards Agreement involves a consideration not only of the requirements of that Agreement but also of the requirements of the NPT, the Statute of the IAEA and the Treaty establishing the Euratom Atomic Energy Community ("the Euratom Treaty").

Accordingly, this paper will first consider the requirements of the NPT. It will then proceed to a consideration of the statutory basis and authority for the application of safeguards by the IAEA, the objectives of those safeguards, the safeguards measures prescribed by the IAEA Statute and the subsequent elaboration of those measures by the Board of Governors of the IAEA both prior to and subsequent to the entry into force of the NPT. The nature of the safeguards required to be implemented under the Euratom Treaty will be discussed with particular reference to those of the IAEA. The requirements of the Euratom/IAEA

Safeguards Agreement will then be dealt with in order to show how that Agreement differs from agreements between the IAEA and individual States in connection with the NPT and to show the nature of the inter-relationship between the safeguards activities of the IAEA and Euratom that has been developed in that Agreement. Finally, the paper will assess whether the Euratom/IAEA Safeguards Agreement might constitute an appropriate model for agreements between the IAEA and individual States in connection with the NPT.

Definition of safeguards

In the context of the peaceful uses of nuclear energy the term "safeguards" has acquired a specialized meaning. Safeguards has been defined, in the First Report of the Ranger Uranium Environmental Inquiry, in the following terms: "A series of international arrangements designed to detect and hence deter the use of nuclear facilities or materials for prohibited purposes, such as the production of nuclear weapons".^{1b}

Two elements of this definition call for comment: the reference to international arrangements and to the concept of deterrence. The need for safeguards in relation to nuclear energy arose with the dropping of the atomic bombs on Japan during the Second World War. Those associated with the development of such weapons realized that the energy created by them could be used as a source of energy for the world at large. As early as November 1945, representatives of Canada, the United Kingdom and the United States of America agreed that international action was needed to prevent the further use of atomic energy in

weapons and to ensure the development of its peaceful applications.² The requirement for international control received further enunciation during the succeeding years (e.g. in the "Baruch Plan", the First Report of the United Nations Atomic Energy Commission to the Security Council of 31 December 1946³ and President Eisenhower's "Atoms for Peace" address to the United Nations General Assembly on 8 December 1953⁴) and achieved concrete realization with the establishment of the International Atomic Energy Agency in 1957.

The reference in the definition to the fact that safeguards are designed "to detect and hence deter" proscribed action is a reflection of the reality that an international safeguards system is not able to prevent such action. The main objective of the system has been described by Dr. H. Gruemm, Deputy Director General, Department of Safeguards, IAEA, as being "to *detect* discrepancies, to *trigger* international reaction and thereby *deter* diversion".⁵ The fact that safeguards, and the international body that applies them, cannot prevent the use of nuclear facilities or materials for proscribed purposes has been recognized at least since the inception of the IAEA,⁶ although one writer suggests that prevention was the objective under the safeguards applied by the IAEA at the time the NPT entered into force.⁷ That view does not appear to me to be sustainable in view of the fact that under the agreements that authorize the application of those safeguards, the IAEA undertakes to apply its safeguards to material, equipment and facilities "to ensure so far as it is able that they will not be used in such a way as to further any military purpose".⁸

Furthermore, such agreements are not expressed in terms that contemplate prevention of proscribed uses. Rather, they rely upon detection of non-compliance with the agreement and publication of that fact to deter use for a proscribed purpose.⁹

It is also apparent from the terms of those agreements, and from the IAEA Statute and the NPT, that safeguards are designed to detect, and hence deter, proscribed action by a State rather than by individuals or groups of individuals. Thus, safeguards are designed to deter the diversion of nuclear materials or facilities from permitted to prohibited uses, *at the national level*. The term "safeguards" does not, therefore, encompass the protection of nuclear materials and facilities against illicit acts by persons or groups within a State (e.g. theft, blackmail, sabotage, terrorism etc.). Protection against such acts is the responsibility of each State rather than of the international body applying safeguards and is properly called "physical protection".¹⁰ Although the term "safeguards" is sometimes loosely used as encompassing "physical protection", such usage should be avoided, as it results in a blurring of the distinction between the responsibility of the international body that applies safeguards and of the State. Physical protection, then, denotes measures taken by a State that are aimed at preventing the "diversion" of nuclear materials or facilities from permitted to prohibited uses *at the subnational level* and at recovering any materials so "diverted". It follows that a State cannot escape its obligations relating to safeguards by alleging, or even proving, that nuclear material has been "lost" as a result

of such subnational activities. Although physical protection is a matter for individual States, the effects of illicit subnational activities are of obvious international concern, and on 3 March 1980 the Convention on the Physical Protection of Nuclear Material, drawn up under the auspices of the IAEA, was opened for signature; it has not yet entered into force.

The fact that safeguards does not encompass physical protection suggests that the definition of safeguards set out at the beginning of this section would more accurately reflect reality if it were modified to read:

"A series of international arrangements designed to detect and hence deter the use by, or with the approval (overt or covert) of, governments of nuclear materials or facilities for prohibited purposes, such as the production of nuclear weapons."

REQUIREMENTS OF NPT

With this definition in mind we can now turn to a consideration of the NPT. The NPT is but one of a series of international treaties that are designed to enhance the objective of nuclear arms control and disarmament in particular, as part of a series of steps along the road to general and complete disarmament. This fact is reflected in a number of the preambular paragraphs of the Treaty and in Article VI of it, which provides:

"Each of the Parties to the Treaty undertakes to pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament under strict and effective international control."

Against this background the NPT, in Article I, requires each nuclear-weapon State Party to the Treaty "not to transfer to any recipient whatsoever nuclear weapons or other nuclear explosive devices or control over such weapons or explosive devices directly, or indirectly; and not in any way to assist, encourage, or induce any non-nuclear-weapon State to manufacture or otherwise acquire nuclear weapons or other nuclear explosive devices, or control over such weapons or explosive devices". A nuclear-weapon State ("NWS") is defined in Article IX.3 of the Treaty as "one which has manufactured and exploded a nuclear weapon or other nuclear explosive device prior to 1 January 1967". Thus for the purposes of the NPT the NWS are: China, France, U.K., U.S.A. and U.S.S.R. India, whose device was exploded in 1974, is not, for the purposes of the Treaty, a NWS.

An obligation correlative to that contained in Article I is imposed on non-nuclear-weapon States ("NNWS") by Article II of the NPT. Article II provides:

"Each non-nuclear-weapon State Party to the Treaty undertakes not to receive the transfer from any transferor whatsoever of nuclear weapons or other nuclear explosive devices or of control over such

weapons or explosive devices directly or indirectly; not to manufacture or otherwise acquire nuclear weapons or other nuclear explosive devices; and not to seek or receive any assistance in the manufacture of nuclear weapons or other nuclear explosive devices."

To implement the latter part of this undertaking Article III.1 requires each NNWS to accept safeguards "for the exclusive purpose of verification of the fulfilment of its obligations assumed under this Treaty with a view to preventing diversion of nuclear energy from peaceful uses to nuclear weapons or other nuclear explosive devices". Those safeguards are to be as set forth in an agreement to be negotiated and concluded with the IAEA in accordance with its Statute and its safeguards system.¹¹ Article III.1 also provides that the procedures for the safeguards required by Article III are to be "followed with respect to source or special fissionable material whether it is being produced, processed or used in any principal nuclear facility or is outside any such facility", and that the safeguards are to be "applied on all source or special fissionable material in all peaceful nuclear activities within the territory of such State, under its jurisdiction, or carried out under its control anywhere".

It is evident from the foregoing that Article III of the NPT not only imposes obligations on the States that are party thereto, but also foresees a role for an international organisation, the IAEA, that is not party to the Treaty. It is also evident that Article III requires

safeguards to be applied in respect of source material as well as in respect of special fissionable material and in respect of such materials in all peaceful nuclear activities of the NNWS. These aspects of Article III of the NPT will be the subject of comment in later parts of this paper.

Article III.4 of the NPT is of particular relevance in the context of the application of the safeguards required by the NPT in the non-nuclear-weapon States of Euratom. That provision obliges NNWS party to the NPT to conclude agreements with the IAEA to meet the requirements of Article III, either individually or together with other States, in accordance with the IAEA Statute, and specifies the time within which the negotiation of such agreements is to commence and the time within which the agreements so negotiated are to enter into force. It was, of course, on the basis of this provision that the Agreement among the non-nuclear-weapon States of Euratom, Euratom and the IAEA was negotiated and concluded. Indeed, the possibility that a group of States might together negotiate and conclude a safeguards agreement with the IAEA was introduced into the text of the NPT at the behest of the Member States of the European Community.¹² The inclusion of that possibility was, however, very much a second-best result for the Euratom Member States, who during the negotiation of NPT sought to have the Euratom safeguards accepted as adequate for the purposes of NPT, which if accepted would have obviated the need for the application of IAEA safeguards and for the presence on their territory of inspectors from non-Euratom countries.¹³ That the Euratom non-nuclear-

weapon States did not achieve this aim was, as with so many aspects of non-proliferation, the result of political factors.¹⁴

IAEA SAFEGUARDS

IAEA Safeguards pre-NPT

The statutory basis for the application of safeguards by the IAEA is to be found in Articles II, III.A.5, XI.F.4 and XII of its Statute. Article II specifies the objectives of the IAEA in the following language:

"The Agency shall seek to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world. It shall ensure, so far as it is able, that assistance provided by it or at its request or under its supervision or control is not used in such a way as to further any military purpose."

This formulation recognises the existence of an intimate relationship between the activities required for peaceful purposes and those leading to the production of nuclear weapons in that most stages needed for the former are also needed for the latter,¹⁵ and is based upon the assumption that it is possible to segregate the peaceful use of nuclear energy from its weapons potential by safeguarding nuclear materials, equipment and facilities.¹⁶ As will be apparent from a reading of the terms of the NPT, that treaty has been drafted on the same basis.

By virtue of Article III.A.5 of its Statute, the IAEA is authorised:

"To establish and administer safeguards designed to ensure that special fissionable and other materials, services, equipment, facilities, and information made available by the Agency or at its request or under its supervision or control are not used in such a way as to further any military purpose; and to apply safeguards, at the request of the parties, to any bilateral or multilateral arrangement, or at the request of a State, to any of that State's activities in the field of atomic energy."

It may be observed from this language that the IAEA is authorised to apply safeguards in two broad sets of circumstances. In the one case the IAEA is authorised, and obliged, to apply safeguards where special fissionable and other materials, services, equipment, facilities and information are made available by the IAEA or at its request or under its supervision or control; and in this case the safeguards administered by the IAEA must be designed to ensure that the special fissionable and other materials, services, equipment, facilities and information are not used in such a way as to further any military purpose.

The fact that the IAEA is obliged, as well as authorised, to administer safeguards in the case under consideration flows from the terms of Article XI of the IAEA Statute. That Article contemplates that any member or group of members of the IAEA who desire to set up any

project for research on, or development or practical application of, atomic energy for peaceful purposes may request the assistance of the IAEA in securing special fissionable and other materials, services, equipment and facilities necessary for that purpose.¹⁷ Such projects are called "Agency projects", and must be approved by the Board of Governors of the IAEA.¹⁸ Once the project has been approved, the IAEA must enter into an agreement with the member or group of members submitting the project.¹⁹ That agreement must contain provisions dealing with the matters enumerated in Article XI.F. Paragraph 4 of Article XI.F requires such an agreement to "(i)nclude undertakings by the member or group of members submitting the project: (a) that the assistance provided shall not be used in such a way as to further any military purpose; and (b) that the project shall be subject to the safeguards provided for in Article XII, the relevant safeguards being specified in the agreement".

In the other case, the IAEA's authorization is to apply safeguards at the request of States. Traditionally, the request has taken one of three forms. In the first form, two States that have entered into a bilateral agreement concerning co-operation in the peaceful uses of nuclear energy, which gives one State (and sometimes each State) the right to apply safeguards in the territory of the other, request the IAEA to enter into an agreement with those States under which the bilateral safeguards rights are transferred to the IAEA (the so-called safeguards transfer agreements).²⁰ The second form relates to a situation where two States have entered into an agreement for co-operation in

the peaceful uses of nuclear energy, under which materials or a facility is to be transferred from one State to the other, which agreement requires the recipient State to enter into a safeguards agreement with the IAEA (the so-called unilateral submission agreements).²¹ The third form relates to a situation where a State, of its own volition, decides to submit the whole, or a part, of its nuclear activities to IAEA safeguards (the so-called voluntary submission agreements). In the last-mentioned form the submission can range from 1 kilogram of plutonium²² to the whole of a State's nuclear fuel cycle.²³ The only example of a voluntary submission of the whole of a State's nuclear fuel cycle was unusual in that it was designed to give effect to a particular State's (Mexico's) obligations under the Treaty for the Prohibition of Nuclear Weapons in Latin America ("the Tlatelolco Treaty").²⁴

It should be noted that the latter part of Article III.A.5 authorising the IAEA to apply safeguards at the request of a State or States does not specify that the safeguards to be applied are to be designed to ensure that nuclear materials etc. are not used in such a way as to further any military purpose. Although in fact in all agreements giving effect to such requests, the IAEA undertakes to apply safeguards to ensure so far as it is able that materials, equipment and facilities will not be used in such a way as to further any military purpose.²⁵

Where the IAEA is applying safeguards at the request of a State or States, it is not necessary that the objective of the safeguards being applied should be to ensure that safeguarded items are not used in such a way as to

further any military purpose. Support for this view is, in my opinion, to be found in the terms of Articles II (second sentence), III.A.5 and XI.F.4 of the IAEA Statute. It is clear from those provisions that it is only where an IAEA project is involved (i.e. where special fissionable and other materials, services, equipment, facilities and information are made available by the IAEA or at its request or under its supervision or control) that the objective of the safeguards applied must be to ensure that the assistance provided is not used in such a way as to further any military purpose. The fact that the objective of the safeguards applied by the IAEA at the request of a State or States may be different to the objective of safeguards applied by the IAEA in relation to IAEA projects will be the subject of further discussion in a later section of this paper.

Features of safeguards prescribed by the IAEA Statute

The essential characteristics of the safeguards to be applied by the IAEA, in respect of any IAEA project or other arrangement where the IAEA is requested by the parties concerned to apply safeguards, are set forth in Article XII of the IAEA Statute. Article XII.A of the IAEA Statute specifies that, to the extent relevant to the project or arrangement, the IAEA has the rights and responsibilities set out below.

Design information

By virtue of Article XII.A.1, the IAEA may examine the design of specialised equipment and facilities, including

nuclear reactors, and approve the design only from the viewpoint of assuring that: it will not further any military purpose; it complies with applicable health and safety standards; and it will permit the effective application of safeguards. All three aspects of approval clearly apply with respect to IAEA projects. In connection with safeguards applied at the request of States the situation is somewhat different. The first aspect of the approval may, but (as will be apparent from what has been said above) need not, be applicable. The second aspect is not applicable since, in the safeguards context, apart from IAEA projects, the IAEA has no power to prescribe or to require the observance of health and safety measures prescribed by it.²⁶ The third aspect of approval is, however, clearly applicable to arrangements under which the IAEA is requested by States to apply safeguards. A related right is contained in Article XII.A.5 whereby the IAEA may approve the means to be used for chemical processing of irradiated materials solely to ensure that such processing will not lend itself to diversion of materials for military purposes and will comply with applicable health and safety standards. The comments with respect to the first two aspects of design information approval apply equally to the two aspects of approval of the means of chemical processing.

Health and safety

Article XII.A.2 gives the IAEA the right to require the observance of any health and safety measures prescribed by it. As mentioned above, this right exists only in respect of IAEA projects. Where the IAEA is applying safe-

guards at the request of a State or States, the IAEA could only require the observance of health and safety measures prescribed by it, if the State or States requested the IAEA to do so or the arrangement pursuant to which the State or States requested the IAEA to apply safeguards authorised the IAEA to require such observance.

Records and reports

The IAEA is authorised by Article XII.A.3 to "require the maintenance and production of operating records to assist in ensuring accountability for source and special fissionable materials used or produced in the project or arrangement". Article XII.A.4 entitles the IAEA to call for and receive progress reports. Each of those rights clearly applies where the IAEA is applying safeguards in connection with an IAEA project and where it has been requested by States to apply safeguards.

Continuation of safeguards

The IAEA may, by virtue of Article XII.A.5, require that special fissionable materials recovered from, or produced as a by-product in, a nuclear process "be used for peaceful purposes under continuing Agency safeguards for research or in reactors, existing or under construction, specified by the member or members concerned". This right makes it clear that where safeguarded nuclear material or a safeguarded facility is used in a nuclear process, the IAEA's right to apply safeguards extends also to special fissionable material recovered from or generated by that process.

Deposit of special fissionable material

Article XII.A.5 also enables the IAEA to require deposit with the IAEA of any excess of any special fissionable materials recovered or produced as a by-product, in order to prevent stockpiling of such materials. The IAEA has not sought to exercise this right to date, although the possibility of the IAEA administering an international plutonium storage scheme has been the subject of consideration of late.²⁷

Inspectors and inspections

Provision relating to inspectors and inspections is contained in Article XII.A.6 and Article XII.C. Article XII.A.6 provides that the IAEA may send inspectors to the recipient State or States with a right of access to all places and data and to any person who, by reason of his occupation deals with materials, equipment or facilities required to be safeguarded. The inspectors are to account for source and special fissionable materials supplied and fissionable products, and to determine whether there is compliance with the undertaking against use in furtherance of any military purpose referred to in Article XI.F.4, with the health and safety measures referred to in Article XII.A.2, and with any other conditions prescribed in the agreement with the IAEA and the State or States concerned. The inspectors are to be designated by the IAEA after consultation with the State or States concerned and may be accompanied by representatives of the State concerned if the State so requests, provided that the inspectors are not thereby delayed or otherwise impeded in the exercise of their functions.

Article XII.C provides that the inspectors also have the responsibility of obtaining and verifying the accounting referred to in Article XII.A.6 and reiterates that they are to determine whether there is compliance with the Article XI.F.4 undertaking, the Article XII.A.2 health and safety measures and with all other conditions in the agreement. Inspectors are also required to report any non-compliance to the Director-General of the IAEA who must thereupon transmit that report to the IAEA Board of Governors.

Sanctions

Sanctions for non-compliance with the requirements of an agreement pursuant to which the IAEA is applying safeguards are dealt with in Article XII.A.7 and Article XII.C. Under Article XII.C, following the receipt of the report on non-compliance from the Director-General, the Board of Governors must determine whether any non-compliance has occurred. The need for the making of such a determination is implicit in the requirement, in Article XII.C, that the Board of Governors is required to call upon the State or States to remedy forthwith any non-compliance which it finds has occurred. The Board must also report the non-compliance to all members of the IAEA and to the Security Council and General Assembly of the United Nations.

If the State or States fail to take fully corrective action within reasonable time, the Board may direct that assistance being provided by the IAEA, or by a member thereof, be curtailed or suspended, and may call for the return of materials and equipment made available to the non-complying State or States. The right to suspend or curtail assistance and to call for the return of materials and equipment is also provided for in Article XII.A.7. In addition to these rights, Article XII.C provides that the IAEA may also, in accordance with Article XIX of the IAEA Statute, suspend the

non-complying member State from the exercise of the privileges and rights of membership. By virtue of Article XIX.B, "(a) member which has persistently violated the provisions of this Statute or of any agreement entered into by it pursuant to this Statute may be suspended from the exercise of the privileges and rights of membership by the General Conference acting by a two-thirds majority of the members present and voting upon recommendation by the Board of Governors".

While the suspension clearly must be effected by the prescribed General Conference majority voting on the Board's recommendation, does the requirement of persistent violation also apply? A number of views are possible. First, the view can be taken that in the case of non-compliance, Article XII.C authorises suspension because of the non-compliance and the failure to take fully corrective steps within a reasonable time, provided that the voting requirements of Article XIX.B are met, and thus the requirement of persistent violation does not apply. Secondly, it could be argued that the requirement for persistent violation does apply, but that the failure to take fully corrective action within a reasonable time constitutes persistent violation. Thirdly, it could be argued that the requirement for persistent violation applies and that one instance of non-compliance, even if accompanied by failure to take fully corrective action within a reasonable time, does not amount to persistent violation. This last argument would be the most difficult to sustain, as the failure to take corrective action within a reasonable time would mean that the violation would be persisting if not

persistent. No reports of non-compliance have been made to date.

Safeguarding of IAEA activities

Article XII.B of the Statute provides for the IAEA to apply safeguards, based on the other provisions of Article XII, to its own activities.

It will be evident from the foregoing that, in essence, IAEA safeguards are based on a system of information provided to the IAEA or to which it has access (design information, the keeping of records by the State and the making of reports by the State to the IAEA) and verification of that information by the IAEA, coupled with limited sanctions that may be applied by the IAEA (the most effective being publicity of default to the international community).

Development of the IAEA's safeguards system

On the basis of the foregoing statutory provisions²⁸ the details of the IAEA's safeguards system have been developed. In that development, IAEA safeguards have been shaped by the nature of specific problems and by the degree to which countries would permit their nuclear industries to be regulated (except in cases where an IAEA project was involved and acceptance of safeguards was mandatory). Initial safeguards were developed in 1958 in response to a Japanese request for assistance in obtaining fuel for a heavy-water research reactor.²⁹ Subsequently, safeguards were expanded in a series of steps to become more generally applicable to a wide range of nuclear processes.³⁰ The first of these general safeguards systems appeared in 1961

and related to reactors of less than 100 megawatts thermal capacity.³¹ In 1964, the safeguards system was extended to cover reactors with greater than 100 megawatts thermal capacity.³² This system was revised in 1965,³³ and was extended in 1966 to incorporate provisions relating to reprocessing plants.³⁴ In 1968 the system was further extended to include provisions for the safeguarding of nuclear material in conversion and fuel fabrication plants. This system, known as "The Agency's Safeguards System (1965, as provisionally extended in 1966 and 1968)",³⁵ constituted the extent of IAEA safeguards development at the date on which the NPT entered into force.

Very briefly, this system set forth for the information of member States of the IAEA and for the guidance of the organs of the IAEA,³⁶ not only general principles of the IAEA's safeguards but also the safeguards procedures to be applied.³⁷ It specifies the circumstances in which safeguards are required and makes provision relating to exemptions from safeguards, suspension of safeguards and termination of safeguards and specifies the conditions that must be satisfied before safeguarded nuclear material may be transferred internationally.³⁸ It requires *design information* relating to facilities to be submitted to the IAEA for review by it; *accounting and operating records* to be kept within the State concerned; and *routine and special reports* to be submitted to the Agency by the State. It also contains provisions relating to *inspections* by the IAEA, both routine and special, for the purpose of auditing records and reports and to verify the amount of safeguarded material and scrutinise the operation of facilities subject to safeguards.

These provisions are not, of themselves, binding on a State and only become legally binding on the entry into force of a safeguards agreement and to the extent that they are incorporated therein.³⁹

The Inspectors Document

The Agency's Safeguards System (1965, as provisionally extended in 1966 and 1968) must also be read in conjunction with the so-called "Inspectors Document",⁴⁰ which elaborates certain provisions in Article XII of the IAEA Statute relating to inspectors. In its 14 paragraphs it deals with the *designation of inspectors, visits of inspectors, rights of access and inspection and the privileges and immunities* of inspectors. Like the provisions of the document containing the safeguards system (hereinafter called the "Safeguards Document"), the provisions of the Inspectors Document only become legally binding when, and to the extent that, they are incorporated into a safeguards agreement.⁴¹

A post-NPT development

A further development in non-NPT IAEA safeguards occurred in February 1974 when the Board of Governors decided that subsequent IAEA safeguards agreements should normally contain provisions which relate the duration of the agreements to the period of actual use of the safeguarded items. The Board also decided that the agreements should normally confirm the right of the IAEA to continue to apply safeguards to produced special fissionable materials until the provisions for termination of safeguards contained in the Safeguards Document have been satisfied.⁴²

Although this decision related to the application of safeguards pursuant to the Safeguards Document, the need for a decision along these lines was identified in meetings of States parties to the NPT that were considering the implementation of Article III.2 of that Treaty. That Article provides:

"Each State Party to the Treaty undertakes not to provide: (a) source or special fissionable material, or (b) equipment or material especially designed or prepared for the processing, use or production of special fissionable material to any non-weapon State for peaceful purposes, unless the source or special fissionable material shall be subject to the safeguards required by this Article."

With respect to NNWS not party to the Treaty, the view was taken that the requirements of Article III.2 would be satisfied by the conclusion of a safeguards agreement in accordance with the Safeguards Document provided that provisions of the kind set out above relating to duration of the agreement and continuation of safeguards on produced special fissionable materials could be included in such agreements.

The effect of the inclusion in an agreement of provisions based on the decision referred to above, is that notwithstanding termination of the agreement, either by act of the parties or effluxion of time, safeguards as provided for in the agreement would continue to apply in connection with items subject to safeguards at the date of termination until the Agency had terminated safeguards on such items in

accordance with the provisions of the Safeguards Document, and also in connection with special fissionable material that had been produced, processed or used in or in connection with items that remained subject to safeguards after the date of termination until the Agency had terminated safeguards on such special fissionable material in accordance with the provisions of the Safeguards Document. Thus, the actual termination of the operation of the provisions of the agreement would occur only when nothing remained to be safeguarded.⁴³

Applicability of non-NPT safeguards to the nuclear fuel cycle

It will be apparent from this consideration of IAEA safeguards of the non-NPT type that there is no requirement that the safeguards to be applied should apply to the whole nuclear fuel cycle of the State submitting to safeguards. In fact, prior to the entry into force of the NPT only one State (Mexico) had accepted safeguards on its entire nuclear fuel cycle, a step that was, in any event, required in order for it to comply with its safeguards obligations under the Tlatelolco Treaty. The fact that safeguards applied in accordance with the Safeguards Document do not necessarily cover the whole nuclear fuel cycle is the single most significant difference between such safeguards and those applied by the IAEA in connection with the NPT. In this context the Indian explosion of a nuclear device in 1974 was particularly instructive. Although no safeguards agreement was breached, the fact that India was able to develop and explode a nuclear device highlighted in the most telling manner, that whatever the limitations of safeguards

over the whole nuclear fuel cycle as an inhibitor of proliferation, safeguards on less than the entire fuel cycle are even less effective as a deterrent to proliferation. Only some of India's nuclear material and facilities were, and are, subject to safeguards.

IAEA NPT Safeguards

Before considering the safeguards that were developed by the IAEA to be applied in connection with the NPT, one should consider the question whether the IAEA is authorised under its Statute to enter into agreements with NNWS party to the NPT under which safeguards are to be applied "with a view to preventing diversion of nuclear energy from peaceful uses to nuclear weapons or other nuclear explosive devices". The need for consideration to be given to that question arises from the fact Article III.1 of the NPT specifies that the safeguards required by that Article are to be "as set forth in an agreement to be negotiated and concluded with the International Atomic Energy Agency in accordance with the Statute of the International Atomic Energy Agency and the Agency's safeguards system", and from the fact that in all of the IAEA's agreements entered into prior to the coming into force of the NPT the IAEA had undertaken to apply its safeguards to the items subject to safeguards under those agreements in order to ensure, so far as it is able, that "they will not be used in such a way as to further any military purpose".

Objective of NPT Safeguards and the IAEA Statute

The objective of the safeguards applied by the IAEA

in connection with the NPT is expressed in Article III.I of the NPT to be the prevention of "diversion of nuclear energy from peaceful uses to nuclear weapons or other nuclear explosive devices". May the IAEA, in accordance with its Statute, apply safeguards having that objective? In an earlier section of this paper it was argued that while the Statute requires that the objective of the safeguards applied to an Agency project is to ensure that relevant items are not used in such a way as to further any military purpose, the Statute does not specify that that is or must be the objective of the safeguards applied by the IAEA at the request of a State or States. Further support for that view can be found in the terms of Article III.B.1 of the IAEA Statute, which specifies that in carrying out its functions the IAEA shall:

"1. Conduct its activities in accordance with the purposes and principles of the United Nations to promote peace and international co-operation, and in conformity with policies of the United Nations furthering the establishment of safeguarded world-wide disarmament and in conformity with any international agreements entered into pursuant to such policies."

The NPT is clearly an international agreement entered into pursuant to the policies of the United Nations furthering the establishment of safeguarded world-wide disarmament; the draft of the treaty was approved by the General Assembly of the United Nations. Given that the NPT is an agreement of the kind referred to in Article III.B.1 of the IAEA Statute, it is clear that the Statute does provide the IAEA

with the legal authority to apply safeguards to achieve the objective specified in Article III.1 of the NPT.

The practice of States members of the IAEA and parties to the NPT also provides support for the view that the IAEA is authorised to enter into such agreements. As of 15 July 1982, there were 113 NNWS party to the NPT and the IAEA had negotiated safeguards agreements with 81 of them.⁴⁴ Of those 81, 70 are members of the IAEA. It may be concluded that those States, in subscribing to a multilateral treaty that provides for the negotiation and conclusion of agreements in accordance with the IAEA Statute and in concluding such an agreement, are satisfied that the IAEA has the necessary authority under its Statute to conclude agreements of the kind referred to in Article III.1 of the NPT, that the functions foreseen for the IAEA under such agreements are compatible with its authorised functions and that, for those of them who are members of the IAEA, their commitments under NPT are compatible with their obligations under the IAEA Statute. Moreover, no State has raised any objection thereto.

A further consideration relevant to this issue is that under the NPT safeguards would be applied only to the peaceful nuclear activities of a State. The principles contained in the Safeguards Document, which are designed to verify the peaceful status of nuclear material in a safeguarded activity through identification of the material by its quantity, composition and location, would thus be equally suited for the IAEA's task under the NPT.

Safeguards on all peaceful nuclear activities

The fact that the NPT only requires safeguards to be applied in respect of "all peaceful nuclear activities" of a State raises the question whether this factor constitutes a limitation on and weakness in the safeguards to be applied. The fact that safeguards are to be applied only in respect of "all peaceful nuclear activities" follows from the nature of the obligation accepted by the NNWS party to the NPT in Article II. Those States have foresworn all access, from whatever route, to nuclear weapons or other nuclear explosive devices. Theoretically, then, all nuclear activities in such a State should be devoted to purposes other than the development or production of nuclear weapons or other nuclear explosive devices. However, as these are the only military uses prohibited by the NPT, it does not follow that all nuclear activities in a State will be peaceful. The NPT does not in fact prohibit, for example, the use of nuclear reactors as propulsion units for military vessels. This weakness has been sought to be minimised in the safeguards developed by the IAEA in connection with the NPT. This matter is further explored later in this paper.

The reference to all peaceful nuclear activities in Article III.1 of the NPT has caused the question to be asked what, if any, rights the IAEA has if not all peaceful nuclear activities are declared to it. This question can conveniently be addressed when considering the safeguards provisions developed by the IAEA in connection with the NPT.

The role of the IAEA as a non-party to the NPT

One writer has expressed the view that it is strange that the IAEA is not a party to the NPT and has observed (and seems implicitly critical of the fact) that the IAEA does not even seem to be under any legal obligation to carry out the functions envisaged in the NPT.⁴⁵ Although there is no reason why, in principle, an international organisation should not be a party to a multilateral treaty, other such treaties do exist that prescribe functions for an international organisation that is not a party thereto. Thus the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, drawn up in 1972, provides for certain functions to be carried out by the International Maritime Organisation (formerly the Intergovernmental Maritime Consultative Organisation) and by the IAEA, neither of which is a party to that Treaty. Nor does it seem to me to be strange that the IAEA is not under any express obligation to carry out the functions assigned to it by the NPT. The NPT imposes obligations on States. Among those obligations is an obligation to enter into a safeguards agreement with the IAEA. The IAEA, not being a party to the treaty, cannot enforce the obligations of parties to the treaty. However, it is authorised under its Statute to enter into a safeguards agreement requested by a State to fulfil that State's obligations under the NPT. And, moreover, the IAEA is required by Article III.B.1 of its Statute to conduct its activities in conformity with a treaty such as the NPT. Once the agreement has been concluded with the IAEA, the latter has certain rights, albeit rather limited, to enforce the obligations contained

in the agreement.

Further development of IAEA safeguards in connection with NPT

The safeguards required in connection with the NPT were developed by the Safeguards Committee (1970), a Committee of the Board of Governors of the IAEA in which any member of the IAEA was entitled to participate. That Committee produced a document ultimately 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" which the Board of Governors requested the Director General of the IAEA to use as the basis for negotiating safeguards agreements between the IAEA and NNWS party to the NPT. It is reproduced in IAEA document (and hereinafter called) INFCIRC/153. INFCIRC/153 in fact constitutes a standard from which few deviations, whether of language or substance, have occurred.

INFCIRC/153 comprises two parts, the first part setting forth the general obligations that one would normally expect to find in a bilateral international treaty dealing with this subject, and the second part specifying the procedures to be applied for the implementation of the safeguards provisions of the first part.

Part I contains provisions relating to: the basic undertaking by the State; the application of safeguards by the IAEA; co-operation between the IAEA and the State; implementation of safeguards; a national system of accounting for a control of nuclear material; provision of information to the IAEA; IAEA inspectors; privileges and immunities;

termination of safeguards; non-application of safeguards to nuclear material to be used in non-peaceful activities; finance; third party liability for nuclear damage; international responsibility; measures in relation to verification of non-diversion; interpretation and application of the agreement and settlement of disputes; and final clauses. A number of these provisions will repay closer consideration.

Modification of an NPT requirement

In paragraphs 1 and 2 of INFCIRC/153, the undertaking of the State to accept, and the right and obligation of the IAEA to apply, safeguards on all source or special fissionable material in all peaceful nuclear activities within the territory of the State, under its jurisdiction or carried out under its control anywhere, for the exclusive purpose of verifying that such material is not diverted to nuclear weapons or other nuclear explosive devices, is expressed in language taken from and encapsulating the essence of Article III.1 of the NPT. The inclusion of the words "in accordance with terms of the Agreement" in paragraphs 1 and 2 of INFCIRC/153 would appear to be unnecessary. The succeeding paragraphs of INFCIRC/153 delimit the safeguards to be applied by the IAEA and accepted by the State, and they do so whether or not the quoted words are included in paragraphs 1 and 2. Why, then, were those words included? One reason for their inclusion might have been to achieve a degree of symmetry with Article III.1 of the NPT, the quoted words being a short-hand reference to the words "as set forth in an

agreement to be negotiated and concluded with the International Atomic Energy Agency in accordance with the Statute of the International Atomic Energy Agency and the Agency's safeguards system". Another possible reason might have been super-abundant caution on the part of the States that participated in the development of INFCIRC/153.

Although these explanations are plausible, a more plausible explanation is that the quoted words were included to enable the modification of the scope of the undertaking by States contained in Article III.1 of NPT. The effect of the inclusion of the quoted words is that safeguards are not applied on all source material, a state of affairs to which no party to the NPT has objected. The definition of nuclear material that is contained in paragraph 112 of INFCIRC/153 incorporates by reference the definitions of "source material" and "special fissionable material" contained in Article XX of the IAEA Statute. Article XX.3 defines source material as "uranium containing the mixture of isotopes occurring in nature; uranium depleted in the isotope 235; thorium; any of the foregoing in the form of metal, alloy, chemical compound, or concentrate; any other material containing one or more of the foregoing in such concentration as the Board of Governors shall from time to time determine; and such other material as the Board of Governors shall from time to time determine". This definition would include ore and ore residues. However, the second sentence of paragraph 112 of INFCIRC/153 provides that the term source material shall not be interpreted as applying to ore or

ore residue, and paragraph 33 of INFCIRC/153 provides that safeguards shall not apply to material in mining or ore processing activities.

Clearly, then, safeguards under INFCIRC/153 are not applied on all source material, although the NPT requires safeguards to be applied on all source material. However, this contravention of the express terms of the NPT must be viewed in its proper perspective. An indication of that perspective may be found in the language used in paragraph 6(c) of INFCIRC/153. That paragraph requires concentration by the IAEA of verification procedures on those stages in the nuclear fuel cycle involving the production, processing, use or storage of nuclear material from which nuclear weapons or other nuclear explosive devices could readily be made, and minimisation of verification procedures in respect of other nuclear material. Although this injunction is expressed in the context of the IAEA ensuring optimum cost-effectiveness, that fact does not alter the value of paragraph 6(c) as an indicator of the perspective in which the difference in language between the NPT and INFCIRC/153 should be viewed.

The fact remains, however, that this discrepancy should not be ignored, if only because of its relevance to the question of undeclared materials and facilities, that was adverted to earlier. As safeguards do not apply to material in mining or ore processing activities, the IAEA will not be aware of the quantity or quality of material in such processes. Nuclear material that is the product of mining or ore processing activities is only subject to a reporting requirement if it is imported or exported (unless

it is exported or imported for specifically non-nuclear purposes)⁴⁶ and only becomes subject to full safeguards when it has reached a composition and purity suitable for fuel fabrication or for isotopic enrichment.⁴⁷

IAEA rights in relation to undeclared items

Such material can, of course, only become subject to safeguards when the IAEA becomes aware of its existence, and the IAEA becomes so aware when the existence of that material is reported to it by a State.⁴⁸ It follows then that a State could understate the material at the starting point of safeguards. What rights does the Agency have in respect of undeclared material or facilities? Prima facie, the IAEA's right to safeguard is limited to a right to apply safeguards to nuclear materials, and in respect of facilities, that have been declared to it by the State. The IAEA does not have police powers and is clearly not an entity authorised to gather intelligence by clandestine or extra-legal means. The traditional view is therefore that the IAEA has no rights in respect of undeclared material or facilities.⁴⁹ A contrary view has recently been expressed by the present Director of the IAEA's Legal Division.⁵⁰ The essence of this view appears in the following quotations therefrom:

"Under NPT safeguards agreements the rights and obligations of the state and the Agency are such that if the Agency is not satisfied that all facilities and nuclear material have been declared to it by the state according to the agreement, then the Director General may report the matter to

the Board of Governors. The Board may then decide on measures to ensure 'verification that nuclear material is not diverted'."...⁵¹

.....

" If the Agency has reason to believe that nuclear material required to be reported by a state has not been reported, it cannot send its inspectors on searching missions. However, it can put questions to the state and it has the possibility, through special inspections which it may request, of gaining access to locations other than the specified strategic points to which it has access during routine inspections. If special circumstances calling for special inspections arose, the restrictions on access associated with routine inspections would be displaced."⁵²

Fundamental to this view is action by the Board of Governors under paragraph 18 of INFCIRC/153. Under that paragraph, "if the Board, upon report of the Director-General, decides that an action by the State is essential and urgent in order to ensure verification that nuclear material subject to safeguards under the Agreement is not diverted to nuclear weapons or other nuclear explosive devices the Board shall be able to call upon the State to take the required action without delay, irrespective of whether procedures for the settlement of a dispute have been invoked".

It may be open to question whether reliance on paragraph 18 of INFCIRC/153 will be particularly beneficial

in relation to undeclared items. It appears from the language used in INFCIRC/153 that a distinction has been drawn between "nuclear material subject to safeguards" and "nuclear material required to be subject to safeguards". The former phrase is used throughout INFCIRC/153 except in paragraphs 14, 19, 91 and 95, where the latter phrase is used, and in paragraph 62 which refers to "nuclear material which is to be subject to safeguards". Given the existence of that distinction, undeclared nuclear material, while it may be "nuclear material required to be subject to safeguards", is clearly not "nuclear material subject to safeguards" and would not fall within the terms of paragraph 18. The existence of the distinction would also appear to preclude any justification for interpreting paragraph 18, on the basis of the so-called principle of effectiveness, as applying to "nuclear material required to be subject to safeguards". To interpret paragraph 18, which appears in all NPT safeguards agreements, in that way on the basis of the "effectiveness principle" would amount to a revision of the agreement in which it appears, particularly in view of the terms of paragraph 19 of INFCIRC/153 (as to which see below).^{52a} However, it might be possible to rely on paragraph 18 in respect of undeclared material, if that material had an adverse impact on the IAEA's verification of material subject to safeguards.

Also, to seek to rely on special inspection rights may be illusory. Paragraph 73 of INFCIRC/153 provides that the IAEA may make special inspections, *inter alia*, if the IAEA considers that information made available by

the State, including explanations from the State and information obtained from routine inspections, is not adequate for the IAEA to fulfil its responsibilities under the Agreement. In circumstances which may lead to special inspections the State and the IAEA are to consult forthwith. As a result of such consultations the IAEA may make inspections in addition to the routine inspection effort provided for in paragraphs 78-82 and may obtain access in agreement with the State to information or locations in addition to the access specified in paragraph 76 for ad hoc and routine inspections. However, any disagreement concerning the need for additional access is to be resolved in accordance with paragraphs 21 and 22 (dealing with interpretation and application of the Agreement and settlement of disputes), and if action by the State is essential and urgent, paragraph 18 is to apply.⁵³ If there is no disagreement over additional access, special inspections would enable the IAEA to obtain further information that may enable it to determine that all is well. But if there is disagreement and action by the State is essential and urgent, paragraph 18 is to apply. And paragraph 18, as seen above, applies in respect of nuclear material subject to safeguards. Paragraph 18 would appear to be relevant and of benefit if it was alleged that nuclear material subject to safeguards was being used in an undeclared facility.

However, it seems that another provision of INFCIRC/153, viz. paragraph 19, either alone or, depending on the circumstances, in conjunction with paragraph 18, is available and would enable the IAEA to take action in respect

of undeclared nuclear material or facilities. Paragraph 19 provides that "if the Board upon examination of the relevant information reported to it by the Director General finds that the Agency is not able to verify that there has been no diversion of nuclear material required to be safeguarded under the Agreement to nuclear weapons or other nuclear explosive devices", the Board may report that fact to the members of the IAEA and to the Security Council and General Assembly of the United Nations, and take the other measures provided for in paragraph 19.

Paragraph 19 is clearly applicable to undeclared nuclear material, as such material is required to be subject to safeguards under the Agreement. That paragraph is also applicable in relation to an undeclared facility, as such a facility will use either undeclared nuclear material or declared nuclear material (which is, of course, nuclear material required to be subject to safeguards). Paragraph 19 can, of course, be used even where there has been no recourse to paragraph 18, i.e. action under the former paragraph is not conditional upon prior action having been taken under the latter paragraph.

On the basis of the foregoing, it is an overstatement to say that the IAEA is unable to take any action with respect to undeclared material or facilities. On the contrary, it may be able to obtain information as a result of special inspection, and at the extreme can take action under paragraph 19 of INFCIRC/153, which is, after all, the ultimate sanction available to the IAEA under INFCIRC/153.

Safeguards and non-proscribed military activities

The addition of the words "in accordance with the terms of the Agreement" to paragraphs 1 and 2 also provides a convenient springboard to a consideration of the provisions that have been included in INFCIRC/153 to regulate the use of nuclear material in activities that are not prohibited by the NPT. Paragraph 14 of INFCIRC/153 specifies the procedures to be followed if a State intends to use nuclear material required to be safeguarded under the Agreement in such an activity. The State is required to inform the IAEA of the activity, making it clear that (i) the use of the material in a non-proscribed military activity will not be in conflict with an undertaking, in respect of which IAEA safeguards apply, that the material will be used only in a peaceful nuclear activity, and (ii) during the period of non-application of safeguards the material will not be used for the production of nuclear weapons or other nuclear explosive devices.⁵⁴

The State and the IAEA must also make an arrangement providing for the non-application of safeguards only while the material is in the non-proscribed activity and which identifies, to the extent possible, the period or circumstances during which safeguards will not be applied. During this time, the IAEA is to be kept informed of the total quantity and composition of such unsafeguarded material in the State and of any export of such material.⁵⁵ The IAEA's agreement to any such arrangement is not to involve any approval or classified knowledge of the military activity or relate to the use of the nuclear material therein.⁵⁶

Critics of the NPT see the provisions contained in paragraph 14 as a substantial defect in the reliability of the NPT safeguards.⁵⁷ Whilst it would, clearly, have been desirable for INFCIRC/153 not to allow nuclear material to be withdrawn from safeguards for non-proscribed military activities, it is unrealistic to expect that States, in the safeguards agreement, would agree to forego a course of action that the NPT permits them to undertake. In the circumstances, the provisions of paragraph 14 of INFCIRC/153 are probably the best that could be expected to be developed.⁵⁸

Other features of INFCIRC/153

We may now turn to consider, briefly, the other provisions contained in Part I of INFCIRC/153. Paragraphs 4-6 deal with implementation of safeguards. The IAEA is required to implement safeguards in a manner designed to avoid hampering the economic and technological development of the State or international co-operation in peaceful nuclear activities, to avoid undue interference in the State's peaceful nuclear activities, and to be consistent with prudent management practices.⁵⁹ Also, in implementing safeguards the IAEA is to take full account of technological developments and is to make use of the principle of safeguarding the flow of nuclear material by use of instruments and other techniques at strategic points.⁶⁰ The IAEA is also enjoined to ensure optimum cost-effectiveness by use of such means as containment as a factor in defining material balance areas⁶¹; statistical techniques and random sampling in evaluating the flow of nuclear material; and, as

mentioned above, concentration of verification procedures on those stages in the fuel cycle involving nuclear material from which nuclear weapons or other nuclear explosive devices could readily be made.⁶² And the IAEA must protect commercial and industrial secrets and other confidential information of which it becomes aware in implementing safeguards.⁶³

State system of accounting for and control of nuclear material

Part I also contains a requirement that the State establish and maintain a system of accounting for and control ("SSAC") of all nuclear material subject to safeguards and specifies that safeguards are to be applied in such a manner as to enable the IAEA to verify, in ascertaining that there has been no diversion of nuclear material, findings of the State's system. And the IAEA, in its verification, is required to take due account of the technical effectiveness of the State's system. The SSAC is thus one of the fundamental pillars of INFCIRC/153: "The backbone of Agency safeguards is the verification of nuclear material based on data generated, in most cases, by the facility operators and transmitted to the Agency by the State. If this data is not generated, it cannot be transmitted, if it is not transmitted it cannot be verified, and if it is not verified there are no international safeguards".⁶⁴

The provisions contained in paragraph 7 of INFCIRC/153 are further elaborated in paragraphs 31 and 32 of that document. Paragraph 32 specifies that the SSAC is to be based on a system of material balance areas and

is to make provision for the establishment of such measures as: a measurement system for determining quantities of nuclear material; the evaluation of precision and accuracy of measurements and the estimation of measurement uncertainty; procedures for identifying, reviewing and evaluating differences in shipper/receiver measurements;⁶⁵ procedures for taking a physical inventory;⁶⁶ procedures for evaluation of accumulations of unmeasured inventory and unmeasured losses; a system of records and reports showing, for each material balance area, the inventory of nuclear material and the changes in that inventory;⁶⁷ procedures to ensure that the accounting procedures and arrangements are being operated correctly; and procedures for provision of reports to the IAEA as required by the Agreement.

Provision of information to the IAEA

The general requirement that the State provide the IAEA with information necessary to enable the effective implementation of safeguards is to be found in paragraph 8 of INFCIRC/153. The particular requirements are set out in Part II of that document.⁶⁸ Paragraph 8, however, limits the amount of information that the Agency is entitled to receive to the minimum consistent with carrying out its responsibilities under the Agreement, as one would expect given the language used in paragraph 4 of INFCIRC/153.

IAEA inspectors

Paragraph 9 of INFCIRC/153 imposes on a State the obligation to ensure that IAEA inspectors can effectively

discharge their functions under the Agreement, requires the IAEA to obtain the State's consent to the designation of inspectors to that State and provides that the activities of inspectors be carried out consistently with the principles mentioned in paragraphs 4 and 5 of INFCIRC/153. It also provides that the repeated refusal of a State to accept the designation of inspectors which would impede inspections to be conducted under the Agreement is to be considered by the Board of Governors, upon referral by the Director General, with a view to its taking appropriate action, which could be action under paragraph 18 or 19 of INFCIRC/153 or under both those paragraphs. The provisions of paragraph 9 are supplemented by paragraphs 70-89 of Part II of INFCIRC/153, details of which are outlined later in this paper.

Privileges and immunities of the IAEA

In implementing safeguards the IAEA, its property, funds and assets, and its staff performing functions under the Agreement are to be accorded, on the basis of the relevant provisions of the Agreement on the Privileges and Immunities of the International Atomic Energy Agency,⁶⁹ such privileges and immunities as will enable the discharge of the IAEA's functions under the Agreement.⁷⁰

Termination of safeguards

Provisions relating to termination of safeguards are set forth in paragraphs 11-13 of INFCIRC/153. The bases for termination are consumption or dilution of nuclear material, export of nuclear material, or use of nuclear

material in non-nuclear activities. The provisions relating to the first and last of these grounds are elaborated, and expanded to cover exemptions from safeguards, in paragraphs 35-38 of Part II on INFCIRC/153, and basically enable termination or exemption with respect to small quantities of material or to nuclear material that is not significant for safeguards purposes. Paragraphs 92 and 94 elucidate notifications required in the case of export.

Third party liability and international responsibility

With respect to third party liability for nuclear damage, the State must ensure that any protection against third party liability for such damage which may be available under the laws of the State is to apply to the IAEA and its officials in the same way as that protection applies to nationals of the State.⁷¹ It is also provided that claims in respect of any damage, other than damage arising out of a nuclear incident, resulting from the implementation of safeguards under the Agreement are to be settled in accordance with international law.⁷² The exclusion of damage arising out of a nuclear incident from the purview of this provision, while it may seem strange at first sight, is understandable in the light of the existence of a number of international Conventions which establish a special regime of third party liability for nuclear damage.⁷³ Under those Conventions liability is channelled to the operator of the facility where the incident occurred or whose fuel was involved.

Other provisions of Part I of INFCIRC/153 have been the subject of comment earlier in this paper (paragraphs 14, 18 and 19). No particular comment is necessary with respect to the remaining provisions, apart from observing that paragraph 23 permits amendments to be made to Part II by recourse to a simplified procedure, and that paragraph 24 provides that the Agreement is to remain in force as long as the State is a party to the NPT.⁷⁴

Objective of IAEA NPT safeguards

Part II of INFCIRC/153 details the procedures to be applied for the implementation of the safeguards provisions of Part I.⁷⁵ The following provision, not surprisingly in the light of the terms of Article III.1 of the NPT, lays down the objective of the safeguards to be applied by the IAEA in connection with the NPT, viz., "the timely detection of 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 deterrence of such diversion by the risk of early detection".⁷⁶ A number of aspects of this objective should be noticed. The requirement of timely detection is self-evident, given that the aim is deterrence of diversion by the risk of early detection. The IAEA is also, consistently with the principle contained in paragraph 6(a) of INFCIRC/153, to concern itself with the non-accountability of significant quantities of nuclear material. These concepts of "timely detection" and "significant quantities" have been

quantified by the IAEA. The times range from the order of 7-10 days, in the case of plutonium, highly enriched uranium or uranium-233 metal, to the order of one year for uranium containing less than 20% uranium-235 and uranium-233, and for thorium. The quantities range from 8 kilograms for plutonium and uranium-233, to 20 tonnes for thorium.⁷⁷

The inclusion in the objective of the words "or for purposes unknown" relieves the IAEA from the onerous task of having to determine that nuclear material that is not properly accounted for has been diverted to nuclear weapons or other nuclear explosive devices and, indeed, of the task of determining the particular use to which diverted material is to be put. Once a significant quantity of nuclear material cannot be properly accounted for the IAEA would take action under paragraph 18 of INFCIRC/153 (if some action by the State concerned would enable an assessment to be made as to whether the material could be accounted for) or under paragraph 19 of INFCIRC/153.

The final thing to be noted about the objective is that while the aim is to detect diversion, it is recognised that safeguards cannot prevent diversion and that the best that can be expected is the deterrence of diversion by the risk of early detection.

In order to achieve that objective, *material accountancy* is to be used as a safeguards measure of fundamental importance, with *containment* and *surveillance* being used as important measures complementary thereto.⁷⁸

Containment and surveillance

A containment measure is one that makes use of existing structural characteristics, such as containers, tanks or pipes, to establish the physical integrity of an area or item by preventing the undetected movement of nuclear material or equipment, the classical example being the application of tamper-indicating seals.⁷⁹ Surveillance refers to both human and instrumental observation aimed at indicating the movement of nuclear material. For example, cameras or other devices may be mounted at strategic points to monitor containment measures or observe inventory changes.⁸⁰

Material accountancy

Material accountancy involves book-keeping by both the State and the IAEA. The State must submit to the IAEA, for examination by it, design information in respect of facilities⁸¹ as well as information in respect of nuclear material outside facilities that is relevant for accountancy purposes.⁸² The State must also keep, as part of its national system of accounting for and control of nuclear material, accounting records of all nuclear material subject to safeguards under the Agreement and operating records for facilities containing such nuclear material.⁸³ Based on those records, the State is required to submit to the IAEA accounting reports and special reports. The accounting reports consist of an initial report of all nuclear material which is to be subject to safeguards under the Agreement and thereafter inventory change reports (showing changes in the inventory

of nuclear material) and material balance reports (showing the material balance based on a physical inventory of nuclear material actually present in the material balance area). Special reports are to be submitted to the IAEA if any unusual occurrence leads the State to believe that there is or may have been a loss of nuclear material that exceeds specified limits or that there is or may have been a loss of nuclear material during an international transfer, or if the containment has unexpectedly changed to the extent that unauthorised removal of nuclear material has become possible.⁸⁴ The State is also required to notify the IAEA of intended imports and exports of nuclear material.⁸⁵

On the basis of the foregoing information the IAEA maintains a set of accounts parallel to that of the State and these are subject to verification and comparison with the records kept by the State. That verification and comparison is effected by means of inspections carried out by the IAEA.

IAEA inspections

Inspections made by the IAEA are of three kinds: ad hoc, routine and special. Ad hoc inspections are made to verify: information in the initial report; changes since the date of the initial report; and the material involved in international transfers.⁸⁶ Within this category may also be included (although they are not so named) inspections to verify design information.⁸⁷ Routine inspections are made in order to verify: that reports are consistent with records; the location, identity,

quantity and composition of all nuclear material subject to safeguards under the Agreement; and, information on the possible causes of material unaccounted for,⁸⁸ shipper/receiver differences and uncertainties in the book inventory.^{89, 90} The IAEA may make special inspections: in order to verify information contained in special reports; or, if the IAEA considers that information from the State, including explanations from the State, and information obtained from routine inspections, is not adequate for the IAEA to fulfil its responsibilities under the Agreement.⁹¹ The scope of IAEA inspections, its access for inspections, the frequency and intensity of routine inspections, notice of inspections, designation of inspectors and the conduct and visits of inspectors are also the subject of detailed provision in INFCIRC/153.⁹²

In relation to the verification activities of the IAEA, INFCIRC/153 specifies that the technical conclusion of those activities is to be a statement, in respect of each material balance area, of the amount of material unaccounted for over a specific period, giving the limits of accuracy of the amounts stated.⁹³ By contrast, under the Safeguards Document the conclusion was simply whether there had or had not been compliance with the Agreement. This provision in INFCIRC/153 is amplified in paragraph 90, which requires the IAEA to inform the State of the results of inspections at agreed intervals, and of the conclusions that the IAEA has drawn from its verification activities in the State, particularly by means of statements in respect of each material balance area, which are to be made as soon as possible after a physical inventory has been taken and

verified by the IAEA and a material balance has been struck.

Import and export of nuclear material

The fact that Part II of INFCIRC/153 contains provisions relating to the import and export of nuclear materials has already been noted above. Two of the paragraphs in that section of the document warrant brief comment. Paragraph 91 is designed to regulate the transfer of responsibility, for safeguards purposes, for nuclear material that is imported or exported. With respect to nuclear material being imported, it provides that imported material shall be regarded as being the responsibility of the importing State from the time that the exporting State ceases to have responsibility for the material, which may be no later than the time at which the material reaches its destination. It also provides that exported material is to be regarded as being the responsibility of the exporting State up to the time at which the importing State assumes responsibility for the material, which may be no later than the time at which the material reaches its destination. As these provisions clearly do not fix the actual time at which responsibility is to be transferred (other than to specify the last moment at which the transfer of responsibility can take place), paragraph 91 further provides that the importing and exporting States are to make suitable arrangements to determine the point at which the transfer of responsibility is to take place. The paragraph also provides that no State is to be deemed to have such responsibility merely by reason

of the fact that the nuclear material is in transit on or over its territory or territorial waters or that it is being transported on a ship under its flag or in its aircraft.

No provision of this kind had appeared in safeguards agreements concluded prior to the development of INFCIRC/153. The significance of the inclusion of such a provision may be illustrated by the so-called "Plumbat affair",⁹³ an event in 1968 involving nuclear material being shipped between two member States of Euratom, the occurrence of which was only revealed in 1977. In the latter year it was revealed that in November 1968 a cargo of uranium ore left Antwerp on a West German ship for Genoa. Neither the ship nor its cargo of uranium reached Genoa. Although it did subsequently appear in Algiers, it did so with a different name, registration, master and crew, but without the cargo of uranium. The loss was detected by Euratom, but the results of its enquiries proved inconclusive. The uranium in question was not subject to IAEA safeguards, although it was subject to Euratom safeguards. However, by virtue of Article 77 of the Euratom Treaty, Euratom's safeguards responsibilities apply only "in the territories of the Member States", and the Euratom Treaty does not contain a provision equivalent to that contained in paragraph 91 of INFCIRC/153.

Clearly, there are difficulties in the IAEA or Euratom applying safeguards on the high seas (or in international airspace). For example, the material may be transported on a ship (or aircraft) the nationality of which is not that of the exporting or importing State.

Paragraph 91 of INFCIRC/153 does represent an attempt to overcome the difficulties, by identifying one State that is to be responsible, at any given time during an international transfer, for safeguards purposes for the material in transit. It would, of course, be naive to believe that the existence of a provision such as paragraph 91 of INFCIRC/153 will prevent another "Plumbat affair". However, it can be expected that the fact that, at any given time during an international transfer, one identified State has safeguards responsibility for the material in transit will cause that State to take whatever measures it can to ensure that the material is not lost, stolen or otherwise diverted while that State has safeguards responsibility for the material.

In relation to export of nuclear material, what might seem to be a strange provision is included in INFCIRC/153. Paragraph 94 provides that if nuclear material will not be subject to IAEA safeguards in the recipient State, the exporting State must make arrangements for the IAEA to receive, within three months of the time when the recipient State accepts responsibility for the nuclear material from the exporting State, confirmation by the recipient State of the transfer. The recipient State where IAEA safeguards will not be applied to the transferred nuclear material can only, in view of the terms of Article III.2 of the NPT, be a nuclear-weapon State, which is, of course, not obliged to accept safeguards under the NPT.⁹⁴

Subsidiary Arrangements

The final matter to be mentioned in relation to Part II of INFCIRC/153 is that the precise details of how the procedures laid down in the Agreement are to be applied in each State are set out in Subsidiary Arrangements to the Agreement between the State and the IAEA⁹⁵ which, although not published, are known to comprise a general part and facility attachments (one for each facility in the State).

EURATOM SAFEGUARDS

The Euratom Treaty specifies the task of Euratom as being "to contribute to the raising of the standard of living in the Member States and to the development of relations with the other countries by creating the conditions necessary for the speedy establishment and growth of nuclear industries".⁹⁶ In order to perform that task Euratom is required by Article 2(e) of the Treaty, *inter alia*, to "make certain, by appropriate supervision, that nuclear materials are not diverted to purposes other than those for which they are intended".

Before turning to the provisions included in Chapter VII of the Euratom Treaty that elaborate Article 2(e), it will be as well to say a few words about Euratom, and to mention briefly the situation under the Euratom Treaty with respect to the supply of ores and source and special fissile materials⁹⁷ and property ownership.⁹⁸

Euratom

Euratom is one of three organisations that are collectively known as the European Communities, the other two being the European Coal and Steel Community ("ECSC") and the European Economic Community ("EEC"). Euratom and the EEC were established by treaties signed in Rome in 1957 and the ECSC by a treaty signed in Paris in 1951. As the institutional structure of the bodies was virtually identical, when the 1957 Rome treaties were signed, a Convention on certain Institutions common to the European Communities was also signed. By that Convention a single Assembly for all three communities was created. That Assembly exercises the powers and functions of the Common Assembly of the ECSC and of the Assemblies of the EEC and Euratom under the three treaties establishing these communities. The same Convention also established a single Court of Justice for the three communities. The Court thus established exercises the jurisdiction conferred on the Courts of the ECSC, the EEC and Euratom by the treaties establishing those communities. In 1967 the Treaty establishing a Single Council and a Single Commission for the European Communities was concluded. That Treaty established a Council of the European Communities ("the Council") to replace the Special Council of Ministers of the ECSC and the Councils of the EEC and Euratom and which exercises the powers and functions of the Councils it replaces. So too, a Commission of the European Communities ("the Commission") was established to replace the separate Commissions of the ECSC, the EEC and Euratom.

Supply and property ownership

Under the Euratom Treaty the supply of ores and source and special fissile materials is to be ensured by means of a common supply policy on the principle of equal access to sources of supply.⁹⁹ With this end in mind an Agency ("the Supply Agency") is established, having a right of option on ores and source and special fissile materials produced in the territories of Member States and an exclusive right to conclude contracts relating to the supply of ores and source and special fissile materials coming from inside Euratom or from outside it.¹⁰⁰ In its activities the Supply Agency is not to discriminate in any way between users on grounds of the use which they intend to make of the supplies requested unless such use is unlawful or is found to be contrary to conditions imposed by suppliers outside Euratom on the consignment in question.¹⁰¹ These basic provisions are elaborated in the remaining Articles in Chapter VI.

With regard to property ownership, special fissile materials are the property of Euratom, whose right of ownership extends to all such materials produced or imported by a Member State, a person or an undertaking, and are subject to the safeguards provided for in Chapter VII of the Treaty.¹⁰² Notwithstanding these rights in Euratom, Member States, persons or undertakings have unlimited right of use and consumption of special fissile materials which have properly come into their possession, subject to the obligations imposed on them by the Treaty, particularly those relating to safeguards, the right of option conferred on the Supply Agency and health and safety.¹⁰³

The Safeguards provisions of the Treaty are contained in Chapter VII and, apart from a number of differences, display a marked similarity to the principles contained in Article XII of the IAEA Statute and in INFCIRC/153.

Objective of Euratom safeguards

The basic provision is contained in Article 77 which requires the Commission¹⁰⁴ to satisfy itself that, in the territories of Member States:

- (a) ores and source and special fissile materials are not diverted from their intended uses as declared by the users; and,
- (b) the provisions relating to supply and any particular safeguarding obligations assumed by Euratom under an agreement with a third State or an international organisation are complied with.¹⁰⁵

It can be noted that the objective of safeguards in the Euratom Treaty differs from that expressed in the IAEA Statute in relation to IAEA projects. The Euratom objective also differs from that set out in the NPT, although the approach in each case is not dissimilar: in the case of Euratom, non-diversion from declared uses; in the case of NNWS party to the NPT who have declared that they will not use nuclear materials for nuclear weapons or other nuclear explosive devices, non-diversion from that declared use.

There exists a further similarity between the NPT and the Euratom Treaty. The NPT does not proscribe all military uses of nuclear material, but only those relating to nuclear weapons or other nuclear explosive devices. So too, a provision is to be found in Article 84 of the Euratom Treaty to the effect that safeguards may not extend to materials intended to meet defence requirements which are in the course of being specially processed for this purpose or which, after being so processed, are, in accordance with an operational plan, placed or stored in a military establishment. Such a use, provided that it does not involve nuclear weapons or other nuclear explosive devices, is compatible not only with the NPT but also with the application of IAEA safeguards under INFCIRC/153.¹⁰⁶ The use of material for such purposes would not, however, be permitted under a safeguards agreement entered into pursuant to the Safeguards Document that incorporated the requirement that nuclear materials were not to be used in such a way as to further any military purpose.

Like the IAEA Statute and the NPT, the Euratom Treaty is also based upon the assumption that it is possible to segregate the peaceful use of nuclear material from its weapons potential by safeguarding nuclear materials, equipment and facilities. Thus, the preamble to, and Article 2(h) of, the Euratom Treaty refer to the promotion of peaceful uses of atomic energy, and it is within this frame of reference that the user makes the declaration of intended use and that the Commission is to satisfy itself that materials are not diverted from the declared intended usage.

Features of safeguards prescribed by the Euratom Treaty

The actual safeguards measures that are designed to enable effect to be given to the specified objectives are to be found in Articles 78-85 of the Euratom Treaty. A brief description of them follows.

Design information

The Commission is to be provided with the basic technical characteristics of installations for the production, separation or other use of source or special fissile materials or for the processing of irradiated fuels, to the extent that knowledge of these characteristics is necessary for the attainment of the objectives in Article 77.¹⁰⁷ By virtue of this requirement, Euratom is to be provided with design information that is essentially similar to that to be provided to the IAEA pursuant to the provisions of Article XII.A.1 of the IAEA Statute and paragraphs 8 and 42-48 of INFCIRC/153. Article 78 of the Euratom Treaty also requires the Commission to approve the techniques to be used for the chemical processing of irradiated materials, to the extent necessary to attain the objectives in Article 77 of the Treaty.¹⁰⁸ This obligation parallels the right that the IAEA has under Article XII.A.5 of its Statute to approve the means to be used for the chemical processing of irradiated fuels. The provisions of Article 78 of the Euratom Treaty have been elaborated in regulations adopted by the Commission. The current requirements are to be found in Articles 1-5 and Annex I of Commission Regulation (Euratom) No. 3227/76 of 19 October 1976 concerning the application of the

provisions on Euratom safeguards.

Records and reports

Operating records are to be maintained and produced to the Commission in order to permit accounting for ores and source and special fissile materials used or produced, which requirement also applies in the case of transport and source materials.¹⁰⁹ This requirement has been developed in Articles 9-11 of the 1976 Regulation. The reporting requirement implicit in Article 79 has been elaborated in Articles 12-21 and Annexes II-IV of the 1976 Regulation. These rights are comparable to those of the IAEA under Article XII.A.3 and XII.A.4 of its Statute and paragraphs 51-69 of INFCIRC/153.

Deposit of special fissile materials

The Commission is authorised to require that any excess special fissile materials recovered or obtained as by-products and not actually being used or ready for use be deposited with the Supply Agency or in other stores supervised by the Commission.¹¹⁰ This right is equivalent to that possessed by the IAEA under Article XII.A.5 of its Statute. In this connection it can be mentioned that the definitions of 'special fissile materials', 'uranium enriched in uranium-235 or uranium-233' and 'source materials' in Article 197 of the Euratom Treaty are substantively identical with the definitions in Article XX of the IAEA Statute of the terms 'special fissionable material', 'uranium enriched in the isotopes 235 or 233', and 'source material'.

Inspectors and inspections

The Commission has the right to send inspectors into the territories of the Euratom Member States. The inspectors have, at all times, access to all places and data and to all persons who, by reason of their occupation, deal with materials, equipment or installations subject to safeguards, to the extent necessary to apply such safeguards to ores and source and special fissile material and to the extent necessary to ensure compliance with Article 77. The inspectors are to be designated by the Commission after consultation with the Member State concerned and may be accompanied by representatives of that State, provided that inspectors are not thereby delayed or otherwise impeded in the performance of their duties.¹¹¹ The inspectors are responsible for obtaining and verifying the records referred to above, and must report any infringement to the Commission.¹¹² These rights are, *mutatis mutandis*, identical with those of the IAEA under Article XII.A.6 and Article XII.C of the IAEA Statute and paragraphs 9, 19 and 70-89 of INFCIRC/153.

If the conduct of an inspection is opposed, the Commission must apply to the President of the Court of Justice of the European Communities for an order that the inspection be carried out compulsorily. Further, the Commission may, if there is danger in delay, issue a written decision for the inspection to proceed (which must be submitted without delay to the President of the Court for subsequent approval).¹¹³ No comparable right is possessed by the IAEA, except that in such circumstances, under paragraph 18 of INFCIRC/153, the Director General of

the IAEA could report the matter to the Board of Governors, which, if it decides that action by the State is essential and urgent in order to ensure verification that material is not diverted, may call upon the State to take the required action without delay.

Sanctions

In the event of an infringement, the Commission may issue a directive calling upon the Member State concerned to take, within the time set by the Commission, all measures necessary to bring the infringement to an end and shall inform the Council thereof. If the Member State does not comply within the time set, the Commission or any other Member State may refer the matter direct to the Court of Justice.¹¹⁴

In the event of an infringement by persons or undertakings of the obligations imposed on them by Chapter VII, the Commission may impose the following sanctions (in order of severity): (i) a warning; (ii) withdrawal of special benefits such as financial or technical assistance; (iii) the placing of the undertaking, for a period not exceeding four months, under the administration of a person or board appointed by common accord of the Commission and the State having jurisdiction over the undertaking; (iv) total or partial withdrawal of source or special fissile materials.¹¹⁵ Decisions of the Commission on those of the above sanctions that require surrender of materials are enforceable in the territories of Member States in accordance with the rules of civil procedure in force in the State concerned.¹¹⁶ And in

support of these provisions, Member States are required to ensure that sanctions are enforced and, where necessary, that infringements are remedied by those committing them.¹¹⁷

These are clearly more comprehensive rights than those available to the IAEA under Article XII.A.7 and Article XII.C of its Statute and paragraphs 18 and 19 of INFCIRC/153, and could be said to coincide more closely with the commonly understood concept of sanctions than do those of the IAEA. While there are similarities between the rights of Euratom and the IAEA, in that in the case of each organisation publicity is to be given to the infringement and assistance and materials may be withdrawn, there are important differences. In the case of Euratom, failure of a State to bring an infringement to an end within the prescribed time enables the Commission or a Member State to refer the matter to the Court of Justice. The IAEA Statute does not authorise the IAEA or a Member State to refer non-compliance to a judicial body. Also, in the event of an infringement by persons or undertakings, the Commission may impose, and in some instances enforce, sanctions on those persons or undertakings. The IAEA has no power to impose sanctions directly on persons or undertakings, although the IAEA's right to curtail or suspend assistance and call for the return of materials and equipment may have an equivalent effect in the ultimate analysis. Furthermore, the Member States of the IAEA are not subject to a statutory requirement to ensure that sanctions are enforced and, where necessary, that the infringements are remedied by those committing them.

The similarities between, and substantial identity of, Euratom and IAEA safeguards is evident from the foregoing description of the safeguards measures prescribed by the Euratom Treaty. These Treaty prescriptions have, as has been mentioned, been elaborated in regulations adopted by the Commission. The current 1976 Regulation replaced two Regulations adopted by the Commission in 1959.¹¹⁸

Differences in objectives of Euratom and IAEA safeguards

The scope of and procedure for these safeguards and the powers of the bodies responsible for their application are expressed to be confined to the attainment of the objectives set out in Chapter VII of the Treaty.¹¹⁹ Those objectives, as has been mentioned above, are not identical with the objectives of safeguards specified in the IAEA Statute in connection with IAEA projects (and not identical with the non-use in such a way as to further any military purpose requirement in other safeguards agreements concluded pursuant to the Safeguards Document). Notwithstanding the difference in objectives or potential objectives, the safeguards measures and procedures included in the Euratom Treaty are virtually identical with those contained in Article XII of the IAEA Statute. It follows from this that the same safeguards measures and procedures can be, and are, used to attain different objectives. Thus the IAEA is not only authorised, but has the capacity, under its Statute, to apply safeguards having the objective expressed in the NPT. Equally, the safeguards measures and procedures contained in the Euratom Treaty are

appropriate to the timely detection of 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. Of course, in the case of Euratom, no question of authorisation under the Euratom Treaty for the application of safeguards to implement the NPT arises; the NPT does not cast such a role upon Euratom.

A supra-national safeguards system

Finally, it should be mentioned that the Commission, in implementing safeguards, deals directly with the operators and not with the Governments of the Member States. That this is so follows from the terms of the Euratom Treaty particularly those relating to safeguards, such as, for example, Articles 77-80. The Euratom safeguards system is thus a supra-national system, with certain rights of sovereignty having been handed over by the Member States to the Commission.¹²⁰ To implement those safeguards, a Directorate of Euratom Safeguards exists which has (as at August 1980) about 150 staff members drawn from all ten Member States of Euratom, of whom about 60 regularly carry out inspections. They are European civil servants and carry out their responsibilities in a manner independent of the States.¹²¹ By way of comparison, as at April 1982, 200 professional staff members had been appointed by the IAEA Director General and approved by the Board of Governors to perform safeguards inspections. Of these, 129 have been designated to carry out inspections in at least one State.¹²²

EURATOM/IAEA SAFEGUARDS AGREEMENT

The Euratom/IAEA Safeguards Agreement consists of an Agreement, formulated in accordance with the provisions set out in INFCIRC/153, and of a Protocol, which forms an integral part thereof.¹²³ The Agreement discloses very few substantive differences from the provisions contained in INFCIRC/153, while the Protocol is intended to amplify certain provisions of the Agreement in their application in the case of Euratom. In this connection it can be mentioned that the preamble to the Euratom/IAEA Agreement provides a useful compendious background to that instrument, and assists in the understanding of the substantive provisions thereof.

Thus, for example, the seventh preambular paragraph, in drawing attention to the fact that the Member States of Euratom have transferred certain aspects of their sovereignty to Euratom, explains why the NNWS members of Euratom as well as Euratom itself are parties to this Agreement with the IAEA. That paragraph reads:

"WHEREAS the States are Members of the European Atomic Energy Community (EURATOM) (hereinafter referred to as 'the Community') and have assigned to institutions common to the European Communities regulatory, executive and judicial powers which these institutions exercise in their own right in those areas for which they are competent and which may take effect directly within the legal systems of the Member States."

In this connection, it can be noted that while Article III.4 of the NPT enables NNWS members of Euratom, *inter alia*, to conclude an agreement with the IAEA "either individually or together with other States in accordance with" the IAEA Statute, Article III.4 makes no reference to an international organisation also being party to such an agreement with the IAEA. Notwithstanding the lack of such a reference, the fact that Euratom as well as the NNWS members of Euratom is a party to the Agreement is consistent with the spirit and the substance of the NPT. The NNWS members of Euratom having transferred certain aspects of their individual sovereignty to Euratom could not, consistently with their obligations under the Euratom Treaty, give full effect to their obligations under the NPT without the participation of Euratom in their Agreement with the IAEA.

Article III.4 of the NPT requires the Agreement to be concluded in accordance with the Statute of the IAEA. Article III.A.5 of the IAEA Statute authorises the IAEA to apply safeguards, *inter alia*, at the request of the parties to any bilateral or multilateral arrangement. This language, it should be noted, refers to parties and not specifically to States. On the basis of that language the IAEA is authorised to apply safeguards pursuant to an agreement to which States and an international organisation are parties.

Role of IAEA and Euratom under the Agreement

Articles 1 to 4 of the Agreement establish the pattern of the Agreement and the fundamental relationships

between the parties thereto. In Article 1 it is the States, being parties to the NPT and bound by the obligations contained therein, that undertake to accept safeguards. In view of the fact that Article III.1 of the NPT attributes to the IAEA the sole responsibility for international safeguards in connection with that Treaty, it is that organisation which is given the right and the obligation that safeguards will be applied in accordance with the terms of the Agreement.¹²⁴

This responsibility is also reflected in Article 3 which defines the relationship between Euratom and IAEA safeguards. That Article provides:

"(a) [Euratom] undertakes, in applying its safeguards on source and special fissionable material in all peaceful nuclear activities within the territories of the States, to co-operate with the [IAEA], in accordance with the terms of this Agreement, with a view to ascertaining that such source and special fissionable material is not diverted to nuclear weapons or other nuclear explosive devices.

(b) The [IAEA] shall apply its safeguards, in accordance with the terms of this Agreement, in such a manner as to enable it to verify, in ascertaining that there has been no diversion of nuclear material from peaceful uses to nuclear weapons or other nuclear explosive devices, findings of [Euratom's] system of safeguards. The [IAEA's] verification shall include, inter alia, independent measurements and observations conducted by the [IAEA] in accordance with the procedures specified in this

Agreement. The [IAEA], in its verification, shall take due account of the effectiveness of [Euratom's] system of safeguards in accordance with the terms of this Agreement."

A number of features of this provision should be noted. Euratom, in applying its safeguards, does not verify that no diversion has taken place; it undertakes, in applying its safeguards, to co-operate with the IAEA, with a view to ascertaining that no diversion has taken place. The IAEA, on the other hand, is to apply its safeguards in such a manner as to enable it to verify, in ascertaining that there has been no diversion, findings of Euratom's system of safeguards; and in its verification is to take due account of Euratom's system of safeguards. It is, then, the responsibility of the IAEA to carry out verification activities.

Euratom safeguards as a system of accounting for and control of nuclear material

This provision also replaces that appearing in paragraph 7 of INFCIRC/153 relating to the establishment and maintenance of a State system of accounting for and control of nuclear material. In the standard agreement under INFCIRC/153 with a single State, that State must first establish its national system of accounting for and control of nuclear materials and of course at the time the agreement is negotiated it is not possible to make any judgement of the technical effectiveness of that system.¹²⁵ However the position with Euratom differs from this situation in that at the time the Agreement was negotiated the Euratom

safeguards system had already been established and operating under the Euratom Treaty for a considerable period of time. Accordingly, it was possible, at the time that Agreement was negotiated, for a judgement to be made by the IAEA as to the technical effectiveness of the Euratom safeguards and to reflect that judgement in the Agreement and Protocol. A further difference between the Euratom situation and that of a single State has already been mentioned, viz. that Euratom safeguards are implemented by Euratom, which deals directly with operators, and not by each individual Member State, whereas the State system of accounting and control is implemented and operated by the State. The inclusion of this Article in the Agreement thus recognises the prior existence of the Euratom safeguards system and represents an acknowledgement by the parties that the safeguards measures comprising the Euratom system are appropriate for the purposes of the Agreement. The parties to the NPT would also appear to consider those measures appropriate as no adverse comment on the Agreement has been made.

Co-operation between IAEA and Euratom

Further reference to the Euratom safeguards is to be found in Articles 4 and 31 of the Agreement. By virtue of Article 4, the IAEA, Euratom and the States are to co-operate, in so far as each party is concerned, to facilitate the implementation of the safeguards provided for in the Agreement, and are to avoid unnecessary duplication of safeguards activities. The first part of this Article, requiring co-operation to facilitate the

implementation of safeguards, clearly applies to all parties to the Agreement and is substantively identical with paragraph 3 of INFCIRC/153. However, the avoidance of duplication requirement (which does not appear in paragraph 3 of INFCIRC/153) can only be directed towards the IAEA and Euratom, because the only safeguards activities implemented under the Agreement, and that are relevant for the purposes of the Agreement, are carried out by the IAEA and Euratom, rather than by the States. Article 31 requires the IAEA, in carrying out its verification activities, to make full use of Euratom's system of safeguards. It can also be noted that under Article 32 of the Agreement, Euratom's system of safeguards, described in that Article as a system of accounting for and control of nuclear material, must comply with the requirements of paragraph 32 of INFCIRC/153. Euratom's system of safeguards thus takes the place of the State's system of accounting for and control of nuclear material that is provided for in paragraph 32 of INFCIRC/153.

The provisions relating to the role of Euratom safeguards, to co-operation between the IAEA and Euratom and to avoidance of unnecessary duplication of safeguards activities that are incorporated in Articles 3, 4 and 31 are an essential feature of this Agreement, and are elaborated in the Protocol, Article 1 of which provides:

"This Protocol amplifies certain provisions of the Agreement and, in particular, specifies the conditions and means according to which co-operation in the application of the safeguards provided for under the Agreement shall be

implemented in such a way as to avoid unnecessary duplication of [Euratom's] safeguards activities."

It can also be mentioned that such considerations do not prevent Euratom from applying any additional safeguards measures to the States in order to meet its continuing obligation to apply safeguards under the Euratom Treaty. A number of other features of this Agreement should also be mentioned.

Provision of design information to IAEA

It is the responsibility of Euratom, rather than the States, to provide information to the IAEA pursuant to the Agreement.¹²⁶ This responsibility is elaborated in the Protocol which, in Article 2, requires Euratom to collect and provide to the IAEA information on facilities and on nuclear material outside facilities on the basis of the agreed indicative questionnaire annexed to the Subsidiary Arrangements. As Subsidiary Arrangements are not made public, it is not possible to know the substance of the agreed indicative questionnaire. With respect to design information, Article 3 of the Protocol, in elaboration of Articles 46 and 48 of the Agreement, provides that the IAEA and Euratom are to carry out jointly the examination of design information and are to include the agreed results thereof in the Subsidiary Arrangements. By contrast, in a normal agreement under INFCIRC/153 the State concerned has no similar role to play in the examination of design information, nor is its agreement required to the results

of the examination that are included in the Subsidiary Arrangements. Article 3 of the Protocol also requires verification of design information to be effected by the IAEA in co-operation with Euratom. Thus, Euratom participates in the verification of design information and, therefore, has a right not enjoyed by a State under the standard INFCIRC/153-type agreements.

Subsidiary Arrangements

The Subsidiary Arrangements to the Agreement are to be made by Euratom (and not the States) with the IAEA,¹²⁷ and the preparation of the Attachments (relating to facilities and nuclear material outside facilities) to the Subsidiary Arrangements is to be performed together by Euratom and the IAEA.¹²⁸

Records and reports requirements

Euratom is responsible for arranging that the records specified in the Agreement are kept in respect of each material balance area.¹²⁹ It is also responsible for the provision to the IAEA of the reports required by the Agreement.¹³⁰ The Protocol requires Euratom to collect the reports from the operators, keep centralised accounts on the basis of those reports, and carry out a technical and accounting control and analysis of the information so received.¹³¹ This control and analysis function is not prescribed as part of the SSAC in paragraph 32 of INFCIRC/153. Once these tasks are completed, Euratom must, on a monthly basis, produce and provide to the IAEA inventory change reports within the time limits

specified in the Subsidiary Arrangements.¹³² Furthermore, Euratom must transmit to the IAEA the material balance reports and physical inventory listings with frequency depending on the frequency of physical inventory taking as specified in the Subsidiary Arrangements.¹³³

Import and export of nuclear material

Euratom's role in the realm of information and reporting also extends to the field of international transfer of nuclear materials. In the context of the Agreement, an international transfer is not involved when nuclear material passes from the territory of one State party to the Agreement to the territory of another State party to the Agreement. Such a transfer is only involved when material is imported from or exported to a State outside the area comprised by the territories of all States party to the Agreement.¹³⁴

With respect to international transfers, Euratom is required by Articles 92 and 95 of the Agreement to give notification to the IAEA of intended transfers out of and into the States, however responsibility for the material involved in such transfers rests with Euratom and the State concerned in accordance with the provisions of Article 91 of the Agreement. It can also be noted in passing that the area comprised by the territories of the States party to the Agreement is also relevant to the exemption limits contained in Article 37 of the Agreement. The limits of the quantities of nuclear material that may be exempted from safeguards apply to the whole area comprised by the States party to the Agreement rather than to the territories of the individual States.

Inspections

From the consideration of the Agreement and Protocol thus far, it will have been apparent that the information and reporting requirements of the Agreement have been elaborated in the Protocol. We may now turn to the matter of inspections which is the most significant aspect of the Agreement and Protocol. The features of the Agreement and Protocol that have been identified so far are not so radically different (apart from the control and analysis function mentioned above) from the standard INFCIRC/153-type agreement: Euratom is to carry out the functions that would be carried out by a State operating a SSAC.

The provisions included in the Agreement for the inspection activities of the IAEA¹³⁵ and their co-ordination with Euratom's inspection activities have received very detailed treatment in the Protocol.¹³⁶ Indeed 15 of the Protocol's 25 Articles deal with inspections.

Routine inspection activities of IAEA and Euratom

Article 10 of the Protocol provides that the routine inspection activities of Euratom and the IAEA, including unannounced inspections, are to be co-ordinated pursuant to the provisions of Articles 11 to 23 of the Protocol. Two comments can be made in relation to this Article of the Protocol. Routine inspections comprise by far the greatest proportion of the inspection activities of the IAEA. Second, the Article recognises that routine inspection activities are and will be carried out by

Euratom. However before proceeding to a consideration of Articles 11 to 23 of the Protocol, a brief account of the negotiations that resulted in their development will assist an appreciation of them. A key issue in the negotiation was the actual inspection effort. Articles 79 and 80 of the Agreement prescribe rules for the determination of maximum routine inspection effort (i.e. the number, intensity, duration, timing and mode of routine inspections at a facility), but do not set figures for actual routine inspection effort. Article 81, however, specifies the criteria to be used for determining the actual number, duration, timing and mode of routine inspections in respect of any facility. These are standard provisions in every INFCIRC/153 agreement. Euratom wished actual figures to be set. This gave rise to problems for the IAEA as it is impossible to determine with certainty definitive maximum inspection figures for a given facility since conditions are constantly changing and it is not possible to anticipate every new situation that may arise. In the end a compromise was reached between Euratom's desire to establish conclusive figures and the IAEA's reluctance to set such figures¹³⁶ which is reflected in these Articles.

Article 11 provides that in determining the actual number, intensity, duration, timing and mode of IAEA inspections in respect of each facility, account is to be taken of the inspection effort carried out by Euratom in the framework of its multinational system of safeguards pursuant to the Protocol. It is also provided that the criteria of Article 81 of the Agreement are to be used to

determine inspection efforts for each facility and that those criteria are to be implemented by using the rules and methods, set forth in the Subsidiary Arrangements, which have been used for the calculation of the inspection efforts in respect of specific examples attached to the Subsidiary Arrangements.¹³⁷ These rules and methods, developed especially for the Euratom situation, were then used in respect of specific theoretical examples of different types of facilities. The figures derived in the specific examples may not be considered as definitive for every actual facility of the same type, but may be taken as a firm indication of what is to be expected in respect of similar facilities.¹³⁸

Such inspection efforts, expressed as agreed estimates of the actual inspection efforts to be applied, are set out in the Subsidiary Arrangements together with relevant descriptions of verification approaches and scopes of inspection to be carried out by Euratom and the IAEA.¹³⁹ (The verification approaches and scopes of inspection specify the various inspection activities required in respect of each individual facility in order to ensure effective inspection thereof and are expressed in terms of man-days¹⁴⁰ of inspection for each inspection activity for both Euratom and the IAEA.)¹⁴¹ These inspection efforts are to constitute the actual maximum inspection efforts at the facility under normal operating conditions and under the following conditions:

- (a) the continued validity of the information on Euratom safeguards provided for in Article 32 of the Agreement, as specified in the Subsidiary Arrangements;

- (b) the continued validity of the information provided to the IAEA in accordance with Article 2 of the Protocol;
- (c) the continued provision by Euratom of the reports pursuant to Articles 60-61, 63-65 and 67-69 of the Agreement, as specified in the Subsidiary Arrangements;
- (d) the continued application of the co-ordination arrangements for inspections pursuant to Articles 10-23 of the Protocol, as specified in the Subsidiary Arrangements; and
- (e) the application by Euratom of its inspection effort with respect to the facility, as specified in the Subsidiary Arrangements, pursuant to Article 13 of the Protocol.¹⁴²

Thus, the actual maximum inspection efforts remain valid only under normal operating conditions and while the additional five conditions obtain.

Co-ordination of routine inspection effort

Having thus regulated the matter of inspection efforts, Articles 14 to 24 of the Protocol proceed to prescribe how the routine inspection activities of Euratom and the IAEA are to be co-ordinated. Article 14(a) provides that, subject to the conditions of Article 13, IAEA inspections are to be carried out simultaneously with the inspection activities of Euratom and that IAEA inspectors are to be present during the performance of certain Euratom inspections. It is also provided that

"whenever the IAEA can achieve the purposes of its routine inspections", IAEA inspectors are to implement the provisions of Articles 74 and 75 of the Agreement (relating to the scope of inspections) through observation of the inspection activities of the Euratom inspectors, provided: that IAEA inspection activities to be implemented other than through observation of Euratom inspection activities which can be foreseen are to be specified in the Subsidiary Arrangements; and that in the course of an inspection, IAEA inspectors may carry out inspection activities other than through the observation of Euratom inspection activities where they find this to be essential and urgent, and if the IAEA could not otherwise achieve the purposes of its routine inspections and this was unforeseeable.¹⁴³ The use of the qualifying phrase "whenever the Agency can achieve the purposes of its routine inspections" is somewhat curious. Presumably it is intended to signify that, whenever the IAEA can achieve those purposes through the observation of Euratom inspection activities, it must do so.

The means necessary to enable this co-ordination of inspection activities of Euratom and the IAEA are set out in succeeding Articles of the Protocol. Thus the general scheduling and planning of Euratom inspections under the Agreement are to be established by Euratom in co-operation with the IAEA,¹⁴⁴ thereby enabling the IAEA to determine its own schedule and planning for inspections. Arrangements for the presence of IAEA inspectors during the performance of certain Euratom inspections are to be agreed in advance by the IAEA and Euratom for each type of facility and, to the extent necessary, for individual facilities.¹⁴⁵ In order to enable the IAEA to decide

as to its presence at a particular Euratom inspection, Euratom must provide the IAEA with an advance statement of the numbers, types and contents of items to be inspected according to the information available to Euratom from the operator of the facility.¹⁴⁶ The general technical procedures for each type of facility and, to the extent necessary, for individual facilities, are to be agreed in advance by the IAEA and Euratom, in particular with respect to the determination of techniques for random selection of statistical samples, and the checking and identification of standards.¹⁴⁷ The co-ordination arrangements for each type of facility set out in the Subsidiary Arrangements are to serve as the basis for the co-ordination arrangements to be specified in each Facility Attachment and the specific co-ordination action on matters so specified in the Facility Attachments is to be taken by Euratom and IAEA officials designated for that purpose.¹⁴⁸

Subject to one exception, samples of nuclear materials for the IAEA are to be drawn from the same randomly selected batches of items as for Euratom and are to be taken together with Euratom samples. The exception applies when the maintenance of or reduction to the lowest practical level of the IAEA inspection effort requires independent sampling by the IAEA, as agreed in advance and specified in the Subsidiary Arrangements.¹⁴⁹ Thus, the taking of samples by the IAEA for its verification purposes independently of, and distinct from, the samples taken by Euratom is possible only where such independent sampling will have the effect of maintaining the IAEA

inspection effort at the lowest practical level or of reducing that inspection effort to the lowest practical level. The nature and extent of such activity must also have been agreed upon in advance and specified in the Subsidiary Arrangements.

It appears from Article 23 of the Protocol that guidelines for the frequencies of physical inventories that are to be taken by facility operators and verified for safeguards purposes have been laid down in the Subsidiary Arrangements. Article 23 requires that the actual frequencies of physical inventories to be taken and verified are to be in accordance with those guidelines. If additional activities under the Agreement in relation to physical inventories are considered to be essential, Article 23 provides that they are to be discussed by the Liaison Committee established by Article 25 of the Protocol and agreed before implementation.¹⁵⁰

In recognition of the facts that IAEA inspectors will normally carry out their inspection activities through the observation of Euratom inspections and that IAEA inspectors will not be present at all Euratom inspections, Article 21 requires Euratom to transmit to the IAEA its working papers for those inspections at which IAEA inspectors were present and inspection reports for all other Euratom inspections under the Agreement. This requirement will enable the IAEA to receive full information on all Euratom inspections, including the results of those inspections.

Ad hoc inspections

In Article 24, the Protocol moves beyond the realm of routine inspections and requires the IAEA, whenever it can achieve the purposes of its ad hoc inspections under the Agreement through observation of the inspection activities of Euratom inspectors, to do so.

Liaison Committee

In order to facilitate the application of the Protocol, the Liaison Committee referred to above was established by Article 25 of the Protocol. It is to meet at least once a year for the purpose of: reviewing, in particular, the performance of the co-ordination arrangements provided for in the Protocol, including agreed inspection efforts; examining the development of safeguards methods and techniques; and considering any questions referred to it by the periodic lower level meetings of the Committee.¹⁵¹ These lower level meetings are to discuss, for individual facilities, the operation of the co-ordination arrangements including, in the light of technical and operational developments, up-dating of agreed estimates of inspection efforts with respect to changes in throughput, inventory and facility operational programmes, and the application of inspection procedures in different types of routine inspection activities and, in general terms, statistical sampling requirements. Any questions not settled are referred to the higher level meeting.¹⁵² If problems arise in the application of Article 13 of the Protocol, particularly when the IAEA considers that the conditions specified in Article 13 have not been met, the Committee

is to meet as soon as possible at the suitable level to assess the situation and discuss the measures to be taken. If a problem cannot be settled, the Committee may make proposals to the Parties, in particular with a view to modifying the estimates of inspection efforts for routine inspection activities.¹⁵³ The Committee is also to elaborate proposals, as necessary, with respect to questions requiring the agreement of the Parties.¹⁵⁴

Euratom action to implement the Agreement

It should be mentioned that the provisions of the Agreement and Protocol having been agreed to by Euratom, it became necessary for Euratom, in order to implement the provisions thereof, to promulgate a new safeguards regulation to replace the two safeguards regulations promulgated in 1959. This was done in Commission Regulation (Euratom) No. 3227/76 of 19 October 1976 concerning the application of the provisions on Euratom safeguards.¹⁵⁵ This Regulation, which repealed the two previous regulations, entered into force on 15 January 1977 pursuant to Article 39 of the Regulation. Briefly, the Regulation consists of 6 parts: Part I dealing with Basic Technical Characteristics (relevant to Articles 42, 43, 44, 45 and 49 of INFCIRC/193) and Particular Safeguard Provisions (relevant to Articles 15, 43, 46 and 91-97 of INFCIRC/193, and closely related to the Facility Attachments that Euratom establishes with the IAEA for each installation);¹⁵⁶ Part II dealing with the Accounting System (relevant to Articles 13, 32, 35, 36, 38, 54-59, 61-69, 97 and 98.2.D of INFCIRC/193).

Incidentally, it is interesting to note that Article 9 of the Regulation requires persons or undertakings operating a nuclear installation or storing nuclear materials to maintain a system of accounting for and control of nuclear materials); Part III dealing with Transfers: Imports/Exports (relevant to Articles 92-93 and 95-97 of INFCIRC/193); Part IV dealing with Specific Provisions (relevant to Articles 33 and 34 and the recording and reporting requirements of INFCIRC/193); Part V dealing with Specific Provisions Applicable in the Territories of Member States Which are Nuclear Weapon States; and Part VI dealing with Final Provisions (relevant to Article 98 of INFCIRC/193). The Regulation, as will be evident from the reference to nuclear-weapon States, deals not only with IAEA requirements but also with Euratom requirements for the purposes of the Euratom Treaty. The Agreement entered into force in February 1977.

Distinguishing features of the Agreement

What, then, are the distinguishing features of this Agreement? The first and most obvious, and least significant, feature of this Agreement is that under it Euratom is to carry out most of the functions that are carried out by a State under the standard INFCIRC/153 agreements. Thus Euratom is, for example, to provide design information, make Subsidiary Arrangements with the IAEA, arrange that the required records are kept and make the required reports to the IAEA, including notifications of intended international transfers. These functions flow from the rights that have been assigned to Euratom by

its Member States and are consistent with Euratom having the responsibility for establishing and maintaining a system of accounting for and control of nuclear materials. If this were the only feature distinguishing this Agreement from the standard INFCIRC/153 agreements, it would be unexceptionable and not worthy of specific comment.

However, Euratom does not only have a system of accounting for and control of nuclear material. It has a supra-national system of safeguards of well-established technical effectiveness in the implementation of which its Member States have no part to play. In that implementation, Euratom deals directly with the operators. It has been long accepted that measures implemented by a State with respect to nuclear material do not constitute safeguards or a safeguards system, a state of affairs that is reflected in the definition of safeguards earlier in this paper and in the fact that INFCIRC/153 itself refers to a State system of accounting for and control of nuclear material rather than to a State system of safeguards. The fact that potential diverters could be States, as well as facility operators, individuals or groups of individuals, makes the term "State safeguards" a misnomer and severely diminishes any credibility that may attach to the findings of such a system. What provides credibility, within the perceived limits of safeguards, is verification by an international body. The existence of the Euratom system of safeguards has resulted in the Community being given rights that are not enjoyed by States, such as the right to examine design information jointly with the IAEA and that its agreement to the results of the examination of design information that are included in the Subsidiary

Arrangements must be sought by the IAEA.

The fact that the IAEA, in its verification, is to take due account of the effectiveness, and make full use, of the Euratom safeguards system and to avoid unnecessary duplication of safeguards activities is a further significant difference, in that it is a safeguards system, rather than a national system of accounting for and control of nuclear materials, that it is to be taken account of, etc. This significance is heightened enormously by the degree of co-ordination of the verification activities of the IAEA and Euratom that is provided for in the Agreement. The routine inspections of the IAEA, which constitute the greatest proportion of the IAEA's verification activities, are to be carried out simultaneously with those of Euratom and normally by observation of the inspection activities of Euratom inspectors. The IAEA's determination of its schedule and planning for inspections can only be made after the general scheduling and planning of the Euratom inspections under the Agreement has been established by Euratom, albeit in co-operation with the IAEA. IAEA inspectors are not to be present during the performance of all Euratom inspections under the Agreement, in which case the IAEA is to receive inspection reports on those inspections from Euratom, and arrangements for the presence of IAEA inspections during the performance of certain Euratom inspections must be agreed in advance between Euratom and the IAEA. Agreement in advance is also required for the general technical procedures for each type of facility. Deviation from the norm of observation of routine inspection activities of Euratom inspectors also

requires agreement in advance, unless the IAEA cannot achieve the purposes of its routine inspections through such observation. Moreover, the IAEA in the realm of ad hoc inspections is also to act through observation of the inspection activities of Euratom inspectors, if the IAEA can achieve the purposes of its ad hoc inspections by so doing.

Indeed it is difficult to imagine a greater degree of co-ordination, of reliance on Euratom safeguards and of avoidance of unnecessary duplication of safeguards activities than is provided for in this Agreement. Mention was made earlier in this paper that the Euratom States sought, during the negotiation of the NPT, to have Euratom safeguards accepted as appropriate for the implementation of the safeguards requirements of the NPT, but that they had to be content with the provision included in Article III.4 of the NPT that enabled them jointly to negotiate an agreement with the IAEA. In view of the terms that Euratom and the NNWS members of Euratom were able to negotiate for inclusion in the terms of this Agreement, one can be forgiven for thinking that they have won back a considerable amount of the ground that they lost during the negotiation of the NPT. However, this notwithstanding, the formal purity of the concept of the IAEA having sole responsibility for the implementation of NPT safeguards has been retained. And to the extent that the actuality has moved away from the concept, the deviation is founded on the safeguards activities of an international, though regional, safeguarding authority.

A MODEL FOR AGREEMENTS WITH OTHER STATES?

One would assume that the model provided by this Agreement would not be generally applicable in other situations. Thus, the view has been expressed that "Euratom is unique in having such a comprehensive safeguards system. The Agency is unlikely to be able to place such confidence in the completeness and reliability of the results of local monitoring in other countries ..."¹⁵⁷ So, too, it has been said that "(w)hether such a system can be taken as a model for other regions depends therefore very much on the particular situation in the region".¹⁵⁸

It seems, however, that the model can be applied to the situation in an individual State. The Euratom Agreement, which entered into force in February 1977, has in fact been used as a model for the Agreement between the Government of Japan and the International Atomic Energy Agency in Implementation of Article III.1 and 4 of the Treaty on the Non-Proliferation of Nuclear Weapons.¹⁵⁹ The Japan Agreement was signed in March 1977 and entered into force in December 1977.

The Japan Agreement and the Euratom Agreement compared

The Japan Agreement, like the Euratom Agreement, consists of an Agreement and a Protocol which forms an integral part of the Agreement.¹⁶⁰ What is more striking, however, is the fact that with very few exceptions the language used is identical with that used in the Euratom Agreement and Protocol. In general terms, no reference is made in the Japan Agreement to the Japanese National

System being a safeguards system or to activities carried out thereunder being safeguards activities. That apart, the two Agreements are substantively identical except in the following respects. In the Preamble to the Agreement, the references describing the Euratom situation have been replaced by the following paragraph:

"WHEREAS the Government of Japan is prepared to carry out, through Japan's national system including inspections, necessary controls on all nuclear activities, including inter alia, fabrication, reprocessing, and establishing and operating reactors;"

This paragraph is followed by the following two paragraphs, the substance of which appears in the Euratom Agreement:

"WHEREAS this system includes examination of design information, maintenance of records and submission of reports to permit nuclear material accounting for Japan, inspection by Japan's inspectors and a system of sanctions;

WHEREAS it is the desire of the Government of Japan and the Agency to avoid unnecessary duplication of their activities."

The only difference in substance between the two Agreements appears in Article 3 of the Japan Agreement. Article 3(a) of the Japan Agreement provides:

"(a) The Government of Japan shall maintain a system of accounting for and control of all nuclear material subject to safeguards

under this Agreement (including independent verification of such material), which the Government of Japan may designate as 'the National System of Safeguards' (hereinafter referred to as 'the National System')."

However, the terms of Article 3(b) and 3(c) of the Japan Agreement are identical with the terms of Article 3(a) and 3(b) of the Euratom Agreement.

The Japan and Euratom Protocols compared

Turning to the Protocol, it can be noted that it consists of 18 Articles as opposed to 25 in the case of the Euratom Protocol. Briefly, the differences between the two Protocols are that: the substance of Articles 16, 18, 19, 20, 22 and 23 of the Euratom Protocol do not appear in the Japan Protocol; Article 4 of the Japan Protocol differs slightly from Article 3 of the Euratom Protocol, in that Japan has no right of agreement to the results of the examination of design information included in the Subsidiary Arrangements; the substance of Articles 6, 7 and 8 of the Euratom Protocol have been consolidated into one Article, Article 7, of the Japan Protocol; and the Japan Protocol contains one Article, Article 2, the substance of which does not appear in the Euratom Protocol.

The substance of the Articles in the Euratom Protocol that do not appear in the Japan Protocol deal with: arrangements for the presence of IAEA inspectors during the performance of certain Euratom inspections to be agreed in advance; general technical procedures for each type

of facility to be agreed in advance; co-ordination arrangements for each type of facility to serve as a basis for co-ordination arrangements in each Facility Attachment; specific co-ordination actions on matters specified in the Facility Attachments to be taken between Euratom and IAEA officials; the taking of samples of nuclear material; and the frequencies of physical inventories to be in accordance with those laid down as guidelines in the Subsidiary Arrangements.

Concurrence of provisions regarding information, reports and inspections

It will be apparent from this description that under the Protocol Japan has been given the same rights as Euratom with regard to information and reporting, and substantially the same rights as Euratom in respect of co-ordination of inspection activities, including inspection efforts. The Articles that have been omitted from the Japan Protocol do not materially diminish the rights contained in Articles 10-14 of the Euratom Protocol, but rather deal with aspects of the implementation of the inspection co-ordination principles laid down in Articles 10-14, and in particular Article 14.

A qualification on these rights is, however, to be found in Article 2 of the Japan Protocol. That Article provides:

"In the implementation of the Agreement, the Agency shall accord to the Government of Japan treatment with respect to safeguards not less favourable than the treatment it accords to other States or a group of States, provided that the

National System achieves and maintains a degree of functional independence and technical effectiveness equivalent to that of such States or group of States."

Before considering these provisions of the Japan Agreement, it should be mentioned that Article 18 of the Protocol establishes a Joint Committee with functions similar to the Liaison Committee established under the Euratom Protocol.

The Japanese national system and independent verification

Turning to the provisions of the Japan Agreement, it is evident from the terms of Article 3(a) that the Japanese national system of accounting for and control of nuclear material subject to safeguards is to include independent verification of such material. What is to be understood by the term "independent verification"? In the case of Euratom it would refer to the verification activities carried out by Euratom, an entity that is independent of both its Member States and the operators within those States. Within Japan, no international body exists that has the rights that Euratom has within its Member States. How then, is it possible to talk about "independent verification" being included in the Japanese national system?

The clue to the answer to this question is to be found in the Report of the Panel on Systems of Accounting for and Control of Nuclear Material,¹⁶¹ which was convened by the IAEA and met in Tokyo from 5-9 November 1973. The

Panel noted that international safeguards and States' systems of accounting for and control of nuclear material have a common objective, viz. the avoidance of diversion of nuclear material to illegitimate uses, but that the objectives of the SSAC are much broader than those of international safeguards. They include, but are not limited to, the deterrence of diversion of nuclear material by risk of detection and are directed against diversion of nuclear materials to unauthorised uses by operators, individuals or groups within the State's jurisdiction.¹⁶²

The Panel also noted that a State may wish to provide assurance itself that a reliable nuclear material accounting and control system is established and carried out, the degree of assurance that the State may require being described by the following levels of increasing assurance:

- (a) Level Ia: Assurance that the operator has an adequate capability to account for and control nuclear material;
- (b) Level Ib: Assurance that the operator's performance of accounting for and control of nuclear material is adequate;
- (c) Level II: Assurance through independent verification that facility accounting for and control of nuclear material have been effective.¹⁶³

Assurance levels Ia and Ib are concerned mainly with gaining assurance that a facility operator, or user of

nuclear material, is capable of (Level Ia) and is employing (Level Ib) the various elements of accounting and control, such as nuclear material accountancy, containment and surveillance, in an acceptable and pre-established manner. Assurance Level II implies activities on the part of the State that would protect against the potential threat of misuse by those who have been entrusted with accounting and control responsibilities and also against diversions not prevented or detected by the accounting and control system of the facility.¹⁶⁴ For Level II assurance, the State's activities would include: establishment of verification criteria needed to provide Level II assurance of State objectives (timeliness, limits of accuracy and confidence levels); establishment of procedures to independently verify that quantities for receipts, shipments, discards and inventory are credible; the conduct of inspections to carry out independent measurements; and evaluation of inspection data in order to make a statement on the fulfilment of the State objectives.¹⁶⁵

It is clear from the foregoing that "independent verification" means activities carried out by the State, independently of the operators, to verify the accounting and control activities of the operators, and applies only where the State is carrying out Level II assurance. And where the State is carrying out Level II assurance, the IAEA can, in its activities, take into account the effectiveness of the State system.

Does the fact that a State is carrying out Level II assurance activities entitle it to be treated in the same

manner as Euratom? The better view would appear to be that it does not, if only because of the fact that the State is a potential diverter. A further reason is that, even in the realm of routine inspection effort, full account can be taken of the technical effectiveness of a State's system (even to the extent co-ordination of activities) within the four corners of INFCIRC/153 itself. Paragraph 81(b) of INFCIRC/153, which appears as Article 81(b) of the Euratom and Japan Agreements, enables this to be done. Article 81 of the Japan Agreement specifies that the criteria to be used for determining the actual number, intensity, duration, timing and mode of routine inspections in respect of any facility are to include:

"(b) The effectiveness of the National System, including the extent to which the operators of facilities are functionally independent of the National System; the extent to which the measures specified in Article 32 have been implemented by the Government of Japan; the promptness of reports provided to the Agency; their consistency with the Agency's independent verification; and the amount and accuracy of material unaccounted for, as verified by the Agency."

Thus, the negotiation of an Agreement and Protocol in substantially the same terms of the Euratom Agreement was, strictly, unnecessary. Moreover, it was unfortunate in that it suggests that a State's system of accounting for and control of nuclear material is equivalent to an international system of safeguards. The precedent should not be repeated and may not even be achieved in the case of

Japan, as Article 2 of the Protocol provides that Japan is to receive treatment not less favourable than Euratom receives, only if the Japanese National System achieves and maintains a degree of functional independence and technical effectiveness equivalent to that of Euratom.

CONCLUSION

The application of safeguards by the IAEA in the NNWS of Euratom pursuant to the Euratom/IAEA Safeguards Agreement represents an imaginative reconciliation of the requirements of the NPT, the IAEA Statute and the Euratom Treaty. That reconciliation, while retaining the formal purity of the concept in the NPT that it is the IAEA that has the sole responsibility for implementing the safeguards required by Article III of the NPT, does enable account to be taken in an appropriate way of the safeguards activities of Euratom and of the effectiveness of those activities. The co-ordination between the safeguards activities of the IAEA and Euratom worked out in the Agreement represent an efficient melding of scarce international resources. One can, however, be critical of the fact that the Agreement makes no formal recognition of the fact that the existence of an international system of safeguards implemented by Euratom was one of the factors which enabled the arrangements included in the Agreement to be developed in the form in which they were developed.

That lack of formal recognition has enabled the Euratom/IAEA Safeguards Agreement to be used as a model for agreements in connection with the NPT between the IAEA

and individual States. Such a development is undesirable in that it has the effect of equating an individual State's system of accounting for and control of nuclear material with an international system of safeguards operated by an international organisation. It is also unnecessary in that appropriate account of the effectiveness of a State's accounting and control system can be taken under paragraph 81(b) of INFCIRC/153.

* * * * *

FOOTNOTES

1. Reproduced in IAEA document INFCIRC/140.
- 1a. Reproduced in IAEA document INFCIRC/193. The Agreement entered into force for Greece on 17 December 1981, the date upon which the IAEA received, pursuant to Article 23(a) of the Agreement, notifications from Greece that its procedures with respect to the coming into force of the Agreement had been completed and from Euratom that it was in a position to apply its safeguards in respect of Greece for the purposes of the Agreement (see INFCIRC/193/Add.2).
- 1b. Ranger Uranium Environmental Inquiry, First Report, 1976 (hereinafter called the 'First Ranger Report'), at p.205.
2. Ibid, at p.117.
3. United Nations document, AEC/18/Rev.1.
4. Reproduced in U.S. Department of State publication 5314 of 1953.
5. H. Gruemm, IAEA Safeguards - Where Do We Stand Today?, in IAEA Bulletin, Vol.21, No.4, August 1979, p.32 at p.36. See also, to the same effect in relation to IAEA non-NPT safeguards, P. Szasz, The Law and Practices of the International Atomic Energy Agency, IAEA Legal Series No.7, 1970 at p.533.
6. IAEA Statute, Article II. requires the IAEA "to ensure, so far as it is able, that assistance provided by it or at its request or under its supervision or control is not used in such a way as to further any military purpose". (emphasis added)

7. L. Parker, International Safeguards Against the Diversion of Nuclear Materials to Non-Peaceful Uses, Vol.27, International and Comparative Law Quarterly, October 1978, p.711 at p.718.
8. See, for example, Section 4 of the Agreement between the International Atomic Energy Agency, the Government of Japan and the Government of the United States of America for the Application of Safeguards by the Agency to the Bilateral Agreement between those Governments Concerning Civil Uses of Atomic Energy, reproduced in IAEA document, INFCIRC/119.
9. Ibid, Section 23.
10. H. Gruemm, supra n.5, at p.35; and see also The Physical Protection of Nuclear Material, reproduced in IAEA document INFCIRC/225 (corrected).
11. Article III.1.
12. H.W. Schleicher, Nuclear Safeguards in the European Community - A Regional Approach, in IAEA Bulletin, Vol.22, No. 3/4, August 1980, p.45, at p.45.
13. B. Goldschmidt, The Negotiation of the Non-Proliferation Treaty (NPT), in IAEA Bulletin Vol.22, No. 3/4, August 1980, p.73 at pp.74 and 79.
14. Ibid, at p.79.
15. United Nations document AEC/18/Rev.1, First Report of the United Nations Atomic Energy Commission to the Security Council, of 31 December 1946, Part II: Findings.
16. First Ranger Report, at p.126.
17. Article XI.A; and see also XI.B, C, and D.
18. Article XI.E.
19. Article XI.F.

20. See, for example, the agreement reproduced in IAEA document INFCIRC/119.
21. See, for example, the agreement reproduced in IAEA document INFCIRC/168.
22. See the agreement reproduced in IAEA document INFCIRC/175.
23. See the agreement reproduced in IAEA document INFCIRC/118, which agreement was also designed to give effect to Mexico's obligations under the Tlatelolco Treaty.
24. The text of which is reproduced in International Treaties Relating to Nuclear Control and Disarmament, IAEA Legal Series No. 9, 1975, at p.17.
25. See, for example, section 4 of the Agreement reproduced in IAEA document INFCIRC/119.
26. See IAEA Statute, Article III.A.6.
27. R. Imai, International Plutonium Storage Schemes, in IAEA Bulletin, Vol.22, No. 3/4, August 1980, at p.51; International Plutonium Management, In IAEA Bulletin, Vol.19, No. 5, October 1977 at p.27.
28. In relation to which see also P. Szasz, *supra* n.5, at pp.525-540.
29. First Ranger Report, at p.119; P. Szasz, *supra* n.5, at p.551.
30. See generally, P. Szasz, *supra* n.5, at pp.551-560.
31. Reproduced in IAEA document INFCIRC/26.
32. Reproduced in IAEA document INFCIRC/26/Add.1.
33. Reproduced in IAEA document INFCIRC/66.
34. Reproduced in IAEA document INFCIRC/66/Rev.1.
35. Reproduced in IAEA document INFCIRC/66/Rev.2.

36. INFCIRC/66/Rev.2, para.3.
37. INFCIRC/66/Rev.2, paras. 29-85, and Annexes I and II.
38. INFCIRC/66/Rev.2, paras. 19-28.
39. INFCIRC/66/Rev.2, para. 4; and see, for example, sections 1(g), 10(a), 10(c), 10(d), 10(f), 12-16 and 18-23 of the Agreement reproduced in IAEA document INFCIRC/119.
40. Reproduced in IAEA document GC(V)/INF/39.
41. See for example sections 24-27 of the Agreement reproduced in IAEA document INFCIRC/119.
42. IAEA documents GOV/1621 and GOV/DEC/79(XVII), Decision no. (11).
43. See sections 2, 27 and 28 of the IAEA/Pakistan/France Agreement, reproduced in IAEA document INFCIRC/239; and sections 2 and 28 of the IAEA/Brazil/FRG Agreement, reproduced in Vol.15 I.L.M. at p.489.
44. IAEA Bulletin Vol. 24, No. 3, September 1982, at p.42.
45. L. Parker, *supra* n.7, at p.718.
46. INFCIRC/153, paras. 34(a) and (b).
47. INFCIRC/153, para. 34(c).
48. INFCIRC/153, paras. 8, 32, 41, 51-69, 92-97 and 107.
49. L. Parker, *supra* n.7, at p.722.
50. L. W. Herron, A Lawyer's View of Safeguards and Non-Proliferation, in IAEA Bulletin, Vol.24, No. 3, September 1982, p.32 at pp.35-36.
51. *Ibid*, at p.35.
52. *Ibid*, at p.36.
- 52a. Interpretation of Peace Treaties with Bulgaria, Hungary and Romania (Second Phase), Advisory Opinion, 1950 ICJ Reports 221. It can also be noted that

the interpretation of paragraph 18, based on its terms, as applying to 'nuclear material subject to safeguards', would be consistent with a reading of the agreement, in which its substance appears, as a whole and would not deprive the agreement of a great part of its value, whereas the alternative interpretation would involve doing violence to the terms of the agreement: see Dissenting Opinion of Judge Read in the above Advisory Opinion, at pp. 234 and 235.

53. INFCIRC/153, para.77.
54. INFCIRC/153, para.14(a).
55. INFCIRC/153, para.14(b).
56. INFCIRC/153, para.14(c).
57. First Ranger Report at pp.127-128.
58. For a discussion of the interrelationship between paragraph 14 and 24 of INFCIRC/153, see First Ranger Report, at pp.123-124.
59. INFCIRC/153, para.4.
60. The term "strategic point" is defined in para.116 of INFCIRC/153. See also the definition "key measurement point" in para.108 of INFCIRC/153.
61. The term "material balance area" is defined in para.110 of INFCIRC/153.
62. INFCIRC/153, para.6.
63. INFCIRC/153, para.5.
64. IAEA Training Activities Related to State Systems of Nuclear Materials Accountancy and Control, in IAEA Bulletin, Vol.19, No.5., October 1977, p.18 at p.18.
65. The term "shipper/receiver difference" is defined in para.114 of INFCIRC/153.

66. The term "physical inventory" is defined in para.113 of INFCIRC/153.
67. The term "inventory change" is defined in para.107 of INFCIRC/153.
68. INFCIRC/153, paragraphs 34, 41-50, 59-69, 92, 95 and 97.
69. Reproduced in IAEA document INFCIRC/9/Rev.2.
70. INFCIRC/153, para. 10.
71. INFCIRC/153, para.16.
72. INFCIRC/153, para.17.
73. See the Conventions reproduced in International Conventions on Civil Liability for Nuclear Damage, IAEA Legal Series No. 4, Vienna 1966; and the Convention relating to Civil Liability in the Field of Maritime Carriage of Nuclear Material, 1971, reproduced in International Legal Conference on Maritime Carriage of Nuclear Substances, 1971, IMCO, London 1972.
74. For a criticism of the right of withdrawal from safeguards agreements see First Ranger Report, at pp.128-130.
75. INFCIRC/153, para.27.
76. INFCIRC/153, para.28.
77. The Present Status of IAEA Safeguards on Nuclear Fuel Cycle Facilities, in IAEA Bulletin, Vol.22, No. 3/4, August 1980, p.2 at pp.4-6.
78. INFCIRC/153, para.29.
79. The Present Status of IAEA Safeguards on Nuclear Fuel Cycle Facilities, supra n.77, at pp.8 and 9; and Containment and Surveillance Measures to Support IAEA Safeguards, IAEA Bulletin, Vol.19, No.5, October 1977, p.20.

80. Ibid.
81. The term "facility" is defined in para.106 of INFCIRC/153.
82. INFCIRC/153, paras. 42-47 and 49-50.
83. INFCIRC/153, paras.51-58.
84. INFCIRC/153, paras.59-69 and 97.
85. INFCIRC/153, paras.92 and 95.
86. INFCIRC/153, para.71.
87. INFCIRC/153, para.48.
88. The term "material unaccounted for" is defined in para. 111 of INFCIRC/153.
89. The term "book inventory" is defined in para.102 of INFCIRC/153.
90. INFCIRC/153, para.72.
91. INFCIRC/153, para.73.
92. INFCIRC/153, paras.74-89.
93. L. Parker, *supra* n.7, at pp.728-729.
94. Of the NWS parties to the NPT, although they are not obliged to do so, the US has entered into an Agreement with the IAEA in connection with the NPT (reproduced in IAEA document INFCIRC/288), as has the UK, in conjunction with Euratom (reproduced in IAEA document INFCIRC/263). The USSR has also agreed to start negotiations with the IAEA in May or June 1983 for an agreement that will place part of its peaceful nuclear installations under IAEA safeguards (see IAEA Press Release, PR83/3, Vienna, 10 February 1983). Although not a party to the NPT, France, together with Euratom, has concluded an agreement, similar to the UK and US Agreements, with the IAEA (reproduced in IAEA document INFCIRC/290).

95. INFCIRC/153, paras. 39 and 40.
96. Euratom Treaty, Article 1.
97. Euratom Treaty, Chapter VI, Articles 52-76.
98. Euratom Treaty, Chapter VIII, Articles 86-91.
99. Euratom Treaty, Article 52.1.
100. Euratom Treaty, Article 52.2.
101. Euratom Treaty, Article 52.2.
102. Euratom Treaty, Article 86.
103. Euratom Treaty, Article 87.
104. Euratom Treaty, Article 3.
105. In this connection, see Euratom Treaty, Chapter X.
106. INFCIRC/153, paragraph 14.
107. Euratom Treaty, Article 78.
108. Euratom Treaty, Article 78.
109. Euratom Treaty, Article 79.
110. Euratom Treaty, Article 80.
111. Euratom Treaty, Article 81.
112. Euratom Treaty, Article 82.
113. Euratom Treaty, Article 81.
114. Euratom Treaty, Article 82.
115. Euratom Treaty, Article 83.1.
116. Euratom Treaty, Article 83.2.
117. Euratom Treaty, Article 83.4.
118. See Euratom Regulation No.7 which established the implementing procedures for the declarations required by Article 78 (Official Journal of the European Communities, No.15, 12.3.1959, p.298/59 and Official Journal of the European Communities No. 34, 29.5.1959, p.649/59) and Regulation No.8 which defined the nature and the extent of the requirements referred to in

Article 79 (Official Journal of the European Communities, No. 34, 29.5.1959, p.651/59).

119. Euratom Treaty, Article 84.
120. H.W. Schleicher, *supra* n.12, at p.46.
121. Ibid, at p.48; and see Article 24 of the Treaty establishing a Single Council and a Single Commission of the European Communities, and Chapter V of the Protocol on the Privileges and Immunities of the European Communities.
122. D.A.V. Fischer, Safeguards - a model for general arms control?, in IAEA Bulletin, Vol.24, No.2, June 1982, p.45, at p.49, footnote.
123. INFCIRC/193, Agreement, Article 26.
124. INFCIRC/193, Agreement, Article 2.
125. See also INFCIRC/153, paras.7 and 81(b).
126. INFCIRC/193, Agreement, Articles 8, 42, 44, 45 and 49.
127. INFCIRC/193, Agreement, Article 39.
128. INFCIRC/193, Protocol, Article 5.
129. INFCIRC/193, Agreement, Articles 51-58.
130. INFCIRC/193, Agreement, Articles 59-65, 67-69 and 97.
Euratom also receives the IAEA's semi-annual statements of book inventory of nuclear material and statements on verification activities, see INFCIRC/193, Agreement, Articles 66 and 90.
131. INFCIRC/193, Protocol, Article 6.
132. INFCIRC/193, Protocol, Article 7.
133. INFCIRC/193, Protocol, Article 8.
134. INFCIRC/193, Agreement, Articles 92, 93, 95, 96, 98.1.B and 98.2.J(a) (ii) and (b) (ii).

135. INFCIRC/193, Agreement, Articles 70-89.
136. R.M. Stein, IAEA Safeguards in connection with NPT and the IAEA - Euratom Safeguards Agreement, in Nuclear Inter Jura '73, Documentation, International Nuclear Law Association, 1973, p.315 at p.330.
137. INFCIRC/193, Protocol, Article 12.
138. R.M. Stein, supra n.136, at p.330.
139. INFCIRC/193, Protocol, Article 13.
140. The term "man-day" is defined in INFCIRC/193, Agreement, Article 98.2.L.
141. R.M. Stein, supra n.136, at p.331.
142. INFCIRC/193, Protocol, Article 13.
143. INFCIRC/193, Protocol, Article 14(b).
144. INFCIRC/193, Protocol, Article 15.
145. INFCIRC/193, Protocol, Article 16.
146. INFCIRC/193, Protocol, Article 17.
147. INFCIRC/193, Protocol, Article 18.
148. INFCIRC/193, Protocol, Articles 19 and 20.
149. INFCIRC/193, Protocol, Article 22.
150. INFCIRC/193, Protocol, Article 23.
151. INFCIRC/193, Protocol, Article 25(b).
152. INFCIRC/193, Protocol, Article 25(c).
153. INFCIRC/193, Protocol, Article 25(d).
154. INFCIRC/193, Protocol, Article 25(e).
155. Official Journal of the European Communities, No. L363 of 31.12.76.
156. H.W. Schleicher, supra n.12, at p.47.
157. L. Parker, supra. n.7, at p.726.
158. H.W. Schleicher, supra n.12, at p.50.

- 159. Reproduced in IAEA document INFCIRC/255.
- 160. INFCIRC/255, Agreement, Article 26.
- 161. Reproduced in IAEA document PL-581.
- 162. Ibid, p.1.
- 163. Ibid, pp.3-4.
- 164. Ibid, p.4.
- 165. Ibid, pp.11-12.

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