

**INTERNATIONAL ATOMIC ENERGY AGENCY:
HARNESSING THE ATOM IN THE NUCLEAR AGE**

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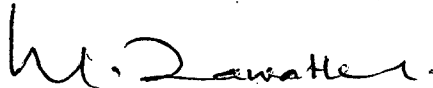
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C E R T I F I C A T E

This is to certify that the dissertation entitled "International Atomic Energy Agency : Harnessing the Atom in the Nuclear Age", being submitted by Mr. Ashutosh Misra, in partial fulfillment of requirement for the award of the Degree of Master of Philosophy in this University, is a record of the student's own work, carried out by him under my supervision and guidance.

It is hereby certified that this work has not been presented for the award of any other degree or diploma.


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TO

THE

VICTIMS OF HIROSHIMA AND NAGASAKI

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PREFACE

The International Atomic Energy Agency, which came into being on 29 July 1957, is an independent intergovernmental organization within the United Nations system. Headquartered in Vienna, Austria, the Agency has more than 100 Member states who together work to carry out the main objectives of IAEA'S Statute : To accelerate and enlarge the contribution of atomic energy to peace, health, and prosperity throughout the world and 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.

This dissertation is basically an effort to present the fundamentals of the IAEA and analyse its significance and usefulness in today's volatile world scenario.

The first chapter deals with the origin, functions and organizational infrastructure of the Agency.

The second chapter is a study of the Technical Assistance Regime of the IAEA through which it furthens the use of atomic energy for peaceful purposes.

The third chapter is an endeavour to present nearly the whole gamut of the most important component of the Agency- ie., the Safeguards.

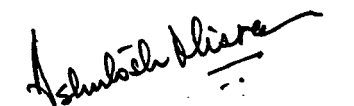
Finally the fourth chapter is an analysis and conclusion of the first three chapters in the recent context.

For a successful and timely completion of this dissertation I owe my sincere thanks to my Supervisor, Prof. M. Zuberi for his valuable guidance and supervision. I am also thankful to the staff of the libraries of Jawaharlal Nehru University, American Center, Ministry of Foreign Affairs, UN Information Centre and Institute of Defence Studies and Analysis.

I would also take this opportunity to thank my parents especially my brother, without whose cooperation this work would not have seen the light of the day. My sincere thanks to my friends Rajesh, Shailendra, Kamal Lochan Satpathy, Alauddin, Saurabh, Sunil, Jayprakash and Prabhakar for proof reading despite their busy schedule.

I take full responsibility for any mistake that might have gone unnoticed in this dissertation.

New Delhi.
21 July, 1994


(ASHUTOSH MISRA)

CHAPTER I

INTRODUCTION

Two principal challenges have confronted the world ever since first controlled chain reaction fifty years ago- the challenge not to use the atom for war and the challenge to exploit it safely for the benefit of mankind.

That the military applications of the new knowledge would be a dangerous and dominant future factor was realised from the outset. In his book 'The making of the Atomic Bomb'; Richard Rhodes quotes Leo Szilard as saying, "I shook hands with Fermi and said I thought this day would go down as a blackday in the history of mankind;¹

Whether one shares that judgment or not one must recognize that the early demonstration of the destructive, ever most sophisticated nuclear weapons show that we do not yet have a suitable answer to the question how to limit the use of the nuclear chain reaction to peaceful purposes, saying this is by no means are on occasion detailed to provide expert assistance while their salaries continued to be paid from the means to ignore that the world has come a very long way in meeting the challenges that arose in 1942. Board approaches have been taken, and international political and legal frameworks and institutions having been created to bring us to our goals.

Origin

At its session in 1946, the General Assembly established,

1. Special report by Hans Blix, IAEA Bulletin, 1993 vol.i, p.32

first an Atomic Energy Commission, and then a Commission on conventional Armaments, both directly responsible to the Security Council. In 1952 these two Commissions were merged into a single Disarmament Commission which was for sometime the main theatre disarmament and arms control negotiations and was at other times largely ignored.²

In the spring of 1946 a committee headed by Dean Acheson produced the so called Acheson-Lilienthal plan for an international atomic development authority, and at the first meeting of the United Nations Atomic Energy Commission the American representative, Bernard Baruch, submitted a proposal modeled on the Acheson-Lilienthal plan. In spite of the vigorous Soviet opposition the American plan, in revised form, was accepted by the majority of the members of the commission and later approved by the General Assembly.

"We are have to a choice between the quick and the dead. That is our business. Behind the black portent of the new atomic age lies a hope which seized upon with faith, can work our salvation. If me fail then me have dammed every man to be the slave of fear. Let us not deceive ourselves. We must elect World peace or World destruction. "With these vigorous words Bernard M. Baruch opened his address at the first session of the Commission on June 14, 1946.³

2. Palmer and Perkins, International Relations, Boston , Houghton Miffilin Co, 1969, p.348.,

3. Ibid

U.S. President Dwight D. Eisenhower's Initiative

There is no dispute that the impulse to create the IAEA came from the address President Eisenhower to the 8th regular session of the General Assembly of the U.N. on 8th December 1953.

The threefold object of this speech was, "to begin to diminish the potential destructive power of the world's atomic stock-piles" i.e., an arms-reduction (but not a disarmament) measures to be accomplished by building up under custody a neutralised "pool" of nuclear materials in the proposal Agency.

To use the impounded material for peaceful application throughout the world- i.e., a technological and possibly an economic assistance measure, in which the Agency would act principally as a "banker" of nuclear materials.

To encourage the people of the world by showing that the great powers were more concerned with human aspiration than with armament and to break the disarmament deadlock by opening up "a new channel for peaceful discussion and initiative" that would enable the world "to shakeoff the inertia imposed by fear and --- to make positive progress towards peace"- i.e., moral psychological initiative.⁴

4. Palmer and Perkins, pp.352.

Though the President's speech was received with immediate acclaim and great enthusiasm the Assembly was not asked to take any action thereon at its current session at first the leaders of the Soviet Union shunned the President's "Atoms for Peace" plan but later they agreed to give it serious attention. Eisenhower's proposal that the nuclear weapon powers should make contribution of fissile material from out of their military programmes to an international atomic energy agency as a step towards nuclear disarmament is of relevance today. According to him this would solve the energy problems of the developing countries. The Agency was to be an atomic police man as well as an atomic Robin Hood.⁵

Late in the summer of 1955 an international conference on the peaceful uses of atomic energy attended largely by scientists was held in Geneva. Hopes rose that the nations which had made the greatest progress in the development of nuclear weapons—the United States, Great Britain, Canada, and the Soviet Union would cooperate in searching for some means of international control in sharing their atomic resource with other nations and utilising atomic energy for peace rather than war.

5. Zuberi, M, "Cooperative Denuclearisation: NPT safeguards and India's Nuclear strategy," International Studies. February 1993, p.156.

6. UN yearbook 1957, pp. 143

Thus finally the Agency came into being in Vienna on 29 July 1957. On 12th November 1957, However, the Statute was approved on 26th October at an international conference held at the United Nations Headquarters. On 12th November 1957 the General Assembly approved an agreement concerning IAEA's relationships with United Nations.

Formulation of the Statute of the IAEA

The formulation of the Statute of the IAEA was accomplished in several successive stages. At each stage the forum of consideration changed and these shifts resulted in a shuttle effect in which the evolving draft was passed back and forth from a small (through ever increasing) group of states to organs in which practically the entire world community was represented. Thus the process of formulating the Statute was itself conditioned by two of the principal issues relating to the contents of that instrument; what should be the relative roles of the central and of the general representative organs of the Agency, and what should be the size and composition of the forums.

STATUTE OF THE AGENCY (EXCERPTS)

ARTICLE II

Objectives

The Agency shall seek to

7. McKnight Allen, 1971 UNITAR Atomic safeguard. A study in international verification pp. 205 UN Yearbook 1957. pp 143. 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 as its request under its supervision or control is not used in such a way as to further any military purpose.

Article III

Function:

A: The Agency is authorised :

1: To encourage and assist research on, and development and practical application of, atomic energy for peaceful uses throughout the world;⁸

2: 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 arrangements, or at the request of a state, to any of that state's activities in the field of atomic energy;

8. Willrich Mason, International safeguards and nuclear Industry; 1973 John Hopkins University Press, London. p.p.291

3: Conduct its activities in accordance with the purpose and principles of the United Nations to promote peace and international

cooperation, and in conformity with the 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;

4: Establish control over the use of special fissionable materials received by the Agency, in order to ensure that these materials are used only peaceful purposes;

Article XII

Agency Safeguards:

A: With respect to any Agency project, or other arrangement where the Agency is requested by the parties concerned to apply safeguards, the Agency shall have the following rights and responsibilities to extent relevant to the project arrangement:

1: To examine the design of specialized equipment and

facilities, including nuclear reactor, and to approve it only from the view point of assuring that it will not further any military purpose, that it will permit effective application of the safeguards provided for in this Article;

2: To require the observance of any health and safety measures prescribed by the Agency;

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 project or arrangement; 4: To call for and receive progress reports;

5: To approve means to be used for the chemical processing of irradiated materials;

6: To send into the territory of the recipient state or states inspectors, designated by the Agency after consultation with the state or states concerned, who shall have access at all times to all places and data and any person who by reason of his occupation deals with materials, equipment or facilities which are required by this Statute to be safeguarded;

7: In the event of non-compliance and failure by the recipient state or states to take requested corrective steps within a reasonable time, to suspend or terminate assistance and withdraw any materials and equipment made available by the Agency or a member in furtherance of the project.

B: The Agency shall, as necessary, establish a staff of inspectors.

C: The staff of inspectors shall also have the responsibility of obtaining and verifying the accounting and of determining whether there is compliance with the undertaking. The inspectors shall report any non-compliance to the Director General who shall thereupon transmit the report to the Board of Governors.

ARTICLE XIV

Finance:

A: The Board of Governors shall submit the General Conference the annual budget estimates for the expense of the Agency. To facilitate the work of the Board in this regard, the Director General shall initially prepare the budget estimates. If the General Conference does not approve the estimates, it shall return them together with its recommendations to the Board. The Board shall then submit further estimates to the general conference for its approval.

b. Expenditure of the Agency shall be classified under the following categories :

1. Administrative expenses : these shall include :

a. Costs of the staff of the Agency other, than the staff employed in connection with materials, services, equipment, and facilities; cost of meetings; and expenditures required for the preparation of Agency projects and for information distribution;

b. Costs of implementing the safeguards in relation to Agency projects or, in relation to any bilateral or multilateral arrangement, together with the costs of handling and storage of special fissionable material by the Agency other than the storage and handling charges;

C. In Board of Governors shall apportion the expenses, among members in accordance with a scale to be fixed by the General Conference..

ARTICLE XIX

Suspension of Privileges

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 General Conference acting by a two third majority of the members present and noting upon recommendation by the Board of Governors.

ARTICLE XX

Definition

As used in the Statute:

1. The term "special fissionable material" means plutonium-239; Uranium-239; uranium enriched in the isotopes 235 or 233; any material containing one or more of the foregoing; and such other fissionable materials as the Board of Governors shall from time to time determine ; but the term "special fissionable material" dose not include source material.
2. The "Uranium enriched in the isotopes 2345 or 233" means Uranium containing the isotopes 235 or 233 or both in an amount such that the abundance ratio of the isotopes 238 is greater than the ratio of the isotopes 235 to the isotopes 238 occurring in nature.

3. In term "source material" means uranium containing the mixtures isotopes occurring in nature; Uranium deleted in the isotopes 235; thorium; any of the foregoing in the form of metal, alloy, chemical compound, or concentrate as the Board of Governors shall from time to time determine; and such other materials as the Board of Governors shall from time to time determine.

MEMBERSHIP

Safegaurds are paid for out of the regular budget of the IAEA. The financing of safeguards is complicated by two factors; the Agency's membership policy and the multiple functions of the Agency.

Membership in the Agency is neither sufficient nor necessary for the application of safegaurds; the Agency derives its safegaurds mandate from other sources (e.g., as a condition of its assistance, through militarily submission by a state, under the terms of a multilateral agreement, etc.). A distinction may be made, however between members and non-members in allocating safegaurds expenses. Under INFCIRC/153, the Agency and membership each bears their own expenses, while complete reimbursement of Agency expenses is normally expected of non-members. There is thus a mild financial incentive for a state to become a member. While it might seem natural and obvious for a verification body created by a chemical weapons convention to apply its verification activities only to members. The possibility of other arrangements should be noted and their implications considered (whether financial, as here, or in terms of the characters of safeguards applied).

Membership of IAEA is open to all states which have signed its Statute within the prescribed period and to any other state whether or not a member of the UN or of any specialised agencies which deposits an instruments of acceptance of the Statute after its membership has been approved by the General Conference of the Agency upon the recommendation of the Board of Governors.

The two main organs of IAEA are the General Conference consisting of all member states, presentably 112 and meeting normally in annual session and the Board of Governors consisting at present of 23 members (1957) which meet at such times as it may determine.

(For the present strength of Agency kindly see the chart).

Organization of the IAEA

Political structures

The development of the safegaurds function in the IAEA is connected to both characters of and the relationship between its two political organs, the General conference and the Board of Government. The Agency's Statute assigns rather general and weak powers to the General conference. The Board is the central organ of the Agency, carrying out its functions, including important powers with respect to safeguards. Budgets report to the United Nations, the appointment of the Director General and some other activities require the agreement of the General conference, but the Board retains among other thing apparently site rights to approve of upper-level staff appointment by the Director General (including of inspectors), to approve of safegaurds policies and

agreement, and to decide and act in cases of feared or actual non-compliance. There is no veto on the Board, even for question of non-compliance, and this practice seems to have worked well. A tradition of consensus decision making has developed within the Agency, this has not always been the case nor it necessary desirable.

The Director General

The Director General is the Chief administration officer of the Agency's. He or she is appointed by the Board, with the approval of the general conference, for a renewable term. Some of his or her appointment such as Deputy Directors general and inspectors, are subject to Board approval, as is the preparation of the Budget. The Director General is require to submit

report to the Board regarding instances of possible non-compliance.

The Director General must be able to give strong direction to the staff. This strong even more important if, as safeguards systems and policies are developed, the initiative gradually shifts from the Board to the Secretariat.

Fischer and SZASZ have noted such a possibility as a result of changes in the Board's composition as well.

The model provided by the Agency for the Director General's position would seem broadly useful for a chemical weapons verification Agency. However the specifics of the Agency's Director General should be more closely examined.

Staffing policies

The term of employment of Agency personnel seem to

be a problem at the lower professional levels. Only a very small absolute number of person are permanent on staff. A Substantially larger number are on contract of five year or so, with a possibility of renewal. Many, however are essentially short or have prospects for promotion. Some are rotated out every two to three years as a home state policy.

The Inspectorate

Conditate inspectors are approved by the Board of governors before they are designated to specific states. There are difficulties with designation process. Although inspection activities may be concentrated among the perssel of the operation division of the Department of Safegaurds.⁹

9. Fishers, D.A.V. "Safeguard-A Model for General Arms control?" P.P.45-49 IAEA Bulletin, Vol.24, no.2,1982,--,and Paul SZASZ.

Safeguarding Atom; A critical appraisal,London;Taylor and Prancis,

1985,

There is no necessity for inspectors to be drawn from those personnel.

This peculiarity,a result of initial organizational problems in the agency,

has an advantage of allowing the Agency to draw on its entire staff of

inspectors. The inspectors are subject to the same general staffing difficulties as Agency staff as a whole, to which must be added the burden of travel and their working conditions. In assigning inspection teams to various countries, the Agency avoids having a state inspected by its own nationals and having more than one national of a given state on a given team. It also avoids assigning the same person to the same facility twice in a row inspection personnel may be rotated through other Agency positions.

Support Services

The Agency depends on the supply of certain resources and related services by states. However, it also provides some essential support services itself for its inspection activities. The Department of Safeguards has, besides its operations divisions, the following support divisions.

Development and Technical Support

This division provides technical services, including new containment and surveillance devices and analytical routines, and the development of safeguards criteria.

Safeguards Information Treatment

This division provides information management services, including documentation and data evaluation.

Safeguards Evolution

This division provides assessments of the Safeguards systems and a Safeguards implementing report indicating areas of

difficulty or of possible improvement.

Standardization, Training and Administrative Support

This division provides management and secretarial services, financial and personnel control, and training. It also tries to standardize safeguards.

The operations divisions carry out inspections, and also undertake preliminary planning on the basis of design information, the updating and revising of inspection routines, the evaluation of inspection reports and the preparation subsidiary arrangements.

Functions of The Agency

An international verification organization must have staff which can on the one hand operate with freedom from crippling national interference yet on the other retain the confidence of states. Some of the personnel problems that may arise, as being linked directly to state Agency relations, are dealt with below.

The Agency staff operates on the principle of an international Civil Services, that is as an organization whose staff is preliminary loyal to it and not to their nation of origin. This is not the only possible model; personnel could be treated as representatives of their governments. This approach could possibly work in a regional context or if those states subject to safeguards were divided different alliances.

The concept of an international civil service requires that states resist the temptation to give instructions to nations

on the staff and that nationals refuse to seek instructions from home states . The actual functioning of these principles will depend not only on the willingness of states to resist temptation but also on the ability of upper -level management to resist state interference in the Agency's personnel policies.

The "colonization" of upper -level positions by nationals of certain states is a problem in the United Nations Secretariat and in some other specialised agencies. It reflects a natural tendency by major states and groups of states to seek representation in the upper ranks of the staff.¹⁰ An obvious problem would be that subordinate personnel would have informal channels of influence by which they could bypass, negate or constrain the activities of the senior administrator. It is not clear to what extent colonization has been or is a problem in the IAEA.

A related phenomenon is that of "sponsorship". The theory the IAEA hires individuals; in practice these individuals must receive formal or informal governments, states thus have some potential control over which of their acceptance of the Agency. This situation complicates Agency staffing by introducing additional personnel selection criteria.

The use of geographic criteria for recruitment is also an issue. The professional staff of the Agency is overwhelmingly Northern and developed state in origin.¹¹

10. Arms Control Verification Occasional Paper No.1, Ottawa Canada, 1988, pp.30.

11. Ibid. p.31

~~_____~~. The Agency explicitly subordinates geographic criteria to technical competence and seems very largely to have succeeded in preserving this ordering. The quota system seems to be applied very loosely. Third World pressures to increase their states representation have been resisted with some success by other states who are fearful of any decline in the technical competence of the Agency personnel.

Confidentiality and Transparency :

The IAEA must meet potentially contradictory demands in its handling of the information acquired in its safeguards activities. It must observe limits on the information it seeks. Problems do arise in the handling of information in the safeguards process but preservation of confidentiality does not seem to be a great difficulty. The Agency is specifically directed in INFCIRC/153 to seek only the minimum information needed to carry out its functions. This is reflected in controls

over its access to design information and in the adoption of safeguard techniques.

Agency personnel are directed not to reveal information they have received through their duties. However Agency staffers may sometimes have contacts with the missions of their home states.¹² If difficulties have arisen through these or

12. Fisher and Szasz . p. 65

Other contacts they have either been fairly minor or kept from public knowledge. While some "informal transparency" could have advantages, good security procedures, staff loyalty, strong upper-level management and the willingness of states to refrain from destructive exploitation are all required.

Reports on inspections are normally only forwarded to the inspected state. In its public statements and published materials the Agency gives only limited information concerning its findings. This tight control over information has caused complaints by the US Nuclear Regulatory Commission that it does not have sufficient information to evaluate Agency safeguards and assurances. Some information could readily be misunderstood or exploited for political and commercial purposes by state or private parties. This was one reason for keeping the safeguards Implementation Report confidential.

Privileges and Immunities of Inspectors

The Agency's inspectors enjoy certain privileges and immunities in order to permit their effective functioning. These are covered in the Agreement on Privileges and Immunities, as well as in specific safeguards agreements. They include personal immunities, protection of baggage and communications, and the use of the UN laissez-passer. While inspectors may be expelled from a

state, expulsion should occur only after consultations between the Director-General and Foreign Minister, and only for cases of abuse, not for official acts.

13. Schiff, B.N. International Nuclear Technology Transfer: Dilemmas of

Dissemination and Control. Totowa, N.J: Rowman and Allanheld, 1983 pp.40.

Field Offices

The Agency has two field offices, in Toronto and Tokyo. The development of field offices, whether they serve major clusters of safeguarded facilities in one state or in a region, helps the Agency achieve greater efficiency in the use of personnel, since travel time to and from centre headquarters is reduced or avoided.

The Designation of Inspectors

Difficulties with the process may effect the efficient use of manpower, at best, and at worst may damage the credibility of the Agency's assurances. States may be slow in responding to suggested designations, thus delaying them and potentiality delaying inspections. More generally, they may reject not merely individual inspectors but, informally, whole categories of persons because of language, nationality or other reasons. The Agency is unable to use all its inspectors everywhere, and so the



most efficient manner.

Constraints on Agency Safeguards Right

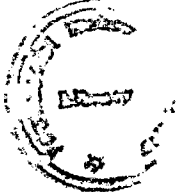
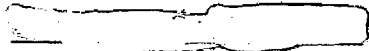
The Agency's safeguards are applied through a chain of agreement with the safeguarded state. In the process of operationalizing the safeguards activities become more specific than the general rights granted in the Board safeguard agreements.

For example, unlike the INFCIRC/66 system, which limit the Agency to a maximum number of inspections per year for various types of facilities, the INFCIRC/153 system applies limits to the number of man-days of inspection per year (the maximum routine inspection effort). In its subsidiary arrangements, the Agency will usually specify its Actual Routine Inspection Effort (ARIE), as smaller number. Japan and Euratom have insisted on taking the ARIE figure as the actual maximum.¹⁴

Sanctions

The IAEA has very limited sanctioning power for a violation of compliance obligations. The Agency can end cooperation with a state in violation and suspend or expel it if it is a member. Its most effective sanction is the power to publish to report an inability to verify compliance to its members, to the United Nation, and to the world in general.

Effective sanctions beyond this one depend on the reaction of the international community and of key states within it.



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14. Fisher and Szasz. p. 61.

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DISPUTE SETTLEMENT^o-

The Agency has general dispute settlement mechanism provided in its Statute, and also makes provision in its safeguards guidelines for the settlement of dispute arising out of its safeguards functions. A particular problem is new to preserve the ability of the Agency to obtain information, to draw conclusions and to act while also protecting the rights of states, especially for a regime of challenge inspections. Further, Fisher and Szasz point out that the dispute settlement mechanism has been used to impede the improvement of safeguards.

14. Fisher and Szasz pp.61.

15. Ibid pp.43

Chapter II

TECHNICAL ASSISTANCE

During the Agency's first decade its principal function and that of greatest interest to most of its Members, was the supply of technical assistance. This refers to a range of activities and programme whose general characteristics are:

(a) They are designed to transfer knowledge from developed states to those less developed;

(b) Since most of the under-developed¹ states are poor, the assistance is generally supplied free of at least foreign currency cost.

Authority

The founders of the Agency did not initially

1. The term "under developed" is the one that appears in the Statute Articles III. A.2 III.B3 and XI.E.6 since it was current that time it was formulated. Later the adjective "less developed" or "developing" gained currency, & these too are used interchangeably. While in principle all these term in the context of the agency should refer to all the states that are backward in the nuclear sciences, which is different and somewhat broader group than those considered nuclear-developed for other purposes in practice this distinction has rarely had any operational consequences.

foresee technical assistance as one of the principal functions of the organization they were planning. However, as the group of states involved in the drafting of the Statute was widened, first in the working level meetings and in the Conference on the Statute, it became obvious that at least in the early years the provision of technical assistance would be of greater interest to most prospective members than the supply of fuel for reactor projects or the safeguard and the health and safety functions.

It is therefore noteworthy that the expression "technical assistance" does not appear in the Statute, especially since at the time of its formulation this term had already gained currency and was well accepted within the UN system.

For want of more explicit statutory directive, the Agency's technical assistance programme have been based on Articles III.A.1-4 and III B.3 of the Statute. Article III A.3 and 4 in particular authorise the Agency to foster the exchange of scientific and technical information and to encourage the exchange and training of scientists and experts- these being classical technical assistance activities. Thus reliance solely on the general provision of Article III implies that the Article is broader in scope than Articles VIII- XII, which spell out how certain principles are carried out.

PROCEDURES

Having found statutory authorities to conduct a technical assistance programme, it is still necessary to determine whether the Statute contain any binding procedural require-

ment governing this activity. The only provision that appears to be directly applicable is Article XI (Agency's projects). Through plainly designed primarily with a view to the supply of fuel to reactors and other nuclear facilities : its working is broad enough to permit its application to all types of assistance granted by the request of its Members.

REQUESTS

Article XI A requires that each project be initiated by a governmental request addressed to the Agency. Every technical assistance activity is indeed based on an official request, but in the case of UNDP/TA and UNDP/SF projects this requests is addressed not to the Agency but to the Administrator of that Programme.²

STATES ELIGIBLE

Article XI.A. also requires that project requests originate with one or more members of the Agency. While assistance under the Agency's regular programme³ is granted only of members (through certain Special mission have also visited

2. Szasz, Paul c., The Law and Practices of the International Atomic Energy Agency ; (VIENNA 19700, Section 18,2,3-4, p.470.

(3) The Agency's "Regular Programme" of technical assistance consists of the projects financed from the Agency's own resources. Operating Fund II (funded from voluntary contributions of money...

non-members⁴, the Agency has also administered UNDP projects in favour of non-members states.

How Assistance Is Granted And Financed

The technical assistance granted by the Agency may be classified into two categories: according to the type of assistance or according to the source of financing. The legal formalities relating to the provisions of assistance relate in part to both these factors-but the connection is closer to the latter. The provision of assistance relate in part to both these factors but the connection is closer to the latter. For that reason the methods of deciding on grants (i.e, the identification of the decision-making authorities).

The Operational Budget

Since technical assistance is not explicitly mentioned in

...the projects conducted from UNDP and other external resources.

The term is some what confusing because the regular technical assistance programme is not financed from the Agency's Regular (i.e, Administrative) Budget (sections 25.2.1) but from the Operational One.

(4) Szasz, Paul.C. Sections 13.3.1, pp.338 and Section 18.3.7. pp.482.

the Statute there is also no indication of how it should be financed. However, the restrictions on the use of Regular (or administrative) Budget, which is assessed on Member States, are such that almost notechanical assistance can be financed from that source.⁵

Because technical assistance cannot be financed from assessed contributions, the device was developed of paying for the Agency's regular Programme of assistance largely from voluntary contributions of money to the general fund; alternatively, and more simply, one might consider the financing of technical assistance to be merely one of the uses to which the general fund established by Article XIV F may be put.

The budget for the regular programme of technical assistance is there established as follows:

(a) A target for the voluntary contribution to be solicited during the fiscal year in question is established by the General Conference on the recommendation of the Board.⁶

(b) On the basis of the target it is recommended and of any other funds in or expected to flow into the general fund, the Board proposes to the General Conference how these resources should be allocated. Each year the larger fraction of these

5. Arrangements for the exchange of scientists between the IAEA and the International Centre for Theoretical physics at Trieste.

6. For example GC (XII)/REX/243 paragraph.1, setting a target of \$ 2million. Section 25.2.2 p.826 and 25.2.2 p.864. (SZASZ, P.C.)

Funds are directed into Operating Fund II, out of which the technical assistance programme is financed. That programme⁷ is itself subdivided into several activities, of which the principal ones are : the supply of experts and equipment, and the provision of fellowship and training.

(c) At the beginning of the fiscal year in question, when most of year pledges for that year have been received, the Director General requests the Board to authorise him to make transfer from the General Fund to the Operating Funds, in accordance with the Fund to the Operating Fund's in accordance with the actual income flow expected.⁸

Since the pledges received invariably fall considerably short of the target on which the budget is based, the Board can only authorise the implementation of an appropriate fraction of the programme each component of which is generally scaled down roughly proportionately from the budget amount. The fact of this chronic shortfall from a target which has not been changed in almost a decade and the consequent regular (and by now anticipated) reduction of the approved technical assistance programme has become one of the constant features and recognised scandals of the Agency, apparently impervious to appeals by the Director General⁹, the Board,¹⁰ the General Conference¹¹ and even

7. For example GC(XII)RES/243 Paragraph 3 allocating \$673000

8. SZASZ, P.C. Section 25.2.4.2.2. P.P. 834.

9. For examples Gc (XI)/OR III. paras 38-39.

10. For examples GC (XI)/362, Para 15 (a)

11. GC (V)/RES/100.

General Assembly¹² ; the conference of Non-Nuclear weapon states has added an oblique plea¹³ echoed by a group of expert appointed by the UN secretary General.¹⁴

(d) Unrestricted voluntary contributions are accepted by the Director General pursuant to the rules regarding the acceptance of Voluntary contributions of money to the Agency.¹⁵ The few contribution restricted to particular types of technical assistance activities are accepted either pursuant to certain standing Board decision relating to these activities, or are submitted to the Board for adhoc decisions.

The Agency's regular Technical Assistance Programme covers the provision of experts, visiting professors, equipment, fellowships, training course and the use of the mobile radioisotopes laboratories. The procedures according to which the technical assistance projects under the regular programme are approved differ according to the type of projects.¹⁶

12. UNGA/RES/1531 (XV) para 2.

13. CNNWS Reso. H.II, reproduced in UN doc. A/7277, para 17.

14. "Contribution of Nuclear technology to the economic and scientific Advancement of developing Countries UN doc. A/7568, paras 43 and 241.

15. INFCIRC/13 ; Part III Sections 25.5.1.2., 25.5.3. P.P 864 (SZASZ, P.C)

16. An early description of these procedures appears in ACABQ'S report on "Administrative and Budgetary coordination" between the UN and the IAEA, (UN doc A/4135, paras 36-39, 42-43, 52-56.)

(1) With respect to fellowships, the Board has delegated to the Director General the authority to make individual awards, subject to the rules and regulations. The Board thus decides only the total amount of fund to be devoted to fellowships but takes no decision either on individual fellowship application or on the numbers to be allocated to any given Member States.

(II) Expert and equipment projects are approved individually by the Board in accordance with the procedures.

(a) Government submit requests ¹⁷ which frequently have been developed with the aid of Agency Experts working either from Headquarter ¹⁸ or participating in a special mission sent for that purpose and indicate their priorities among these.

(b) The governmental requests are evaluated by the Secretariat.

(c) On the basis of this evaluations, consultations are conducted with each Government in order to eliminate some of the projects, to reduce the scope of others, and to establish an order of priorities.

(d) A proposal for a consolidation programme (within the Operating Fund II) is then prepared and submitted by the Deputy Direc-

17. The procedure for submitting such requests and in particulars the information to be submitted is outlined in Annex I to the booklet "IAEA Services and assistance" (GEN/PUB/12, Vienna, 1966).

18. AM. 1/7 Section 9.4.4.1. pp. 218. (SZASZ, P.C.)

tor General for Technical Assistance and Publication to the interdepartmental Committee on Technical Assistance (ICTA). programme is then submitted to Director General.

(E) The Director General then submits the consolidated programme to the Board's Technical Assistance Committee (Which is Designedly balanced between developed and underdeveloped states).¹⁹ The Committee examines each project as well as the programme as a whole.

(f) The approval of the Committee constitutes informal but accepted authority for Director General to start implementing the Programme on 1 January even before the board itself has given final approval²⁰.

(g) The Board considers its committee's report and approves the programme at its first meeting during the calender year (usually late in February).

(h) If a government submits any extraordinary requests to be implemented during a year for which the comprehensive programme has already been approved by the Board, that request must be submitted to the Board. However, minor adjustments to approved projects may be authorised by the Director General.²¹

(I) The Board has now given the Director General standing authority to cancel, in consultation with the government concerned, any project for which no allocation have been made during a

19. A claim explicitly asserted in GC (VI)/203, Para 13.

20. Section 25.2.4.2.3 pp. 834. (SZASZ, P.C.)

21. TA guiding principles Nos. 10 and 11.

period of two years after initial approval, and to apply the funds released to other approved projects.

(II) The provision of visiting Professors, the arrangement of training courses and mobile Radioisotope Laboratories are decided by the Director General within an overall budgetary limit established by the Board for these activities but without consulting it as to specific projects. Within the Secretariat all such projects are evaluated by both the Technical Assistance Division in relation to all other projects carried out in the country or region affected and by the Scientific Division with respect to technical feasibility and desirability.

Gifts in Kinds

Gifts in kind are important source of resources for the Agency's Regular Technical Assistance Programme. These gifts are offered, usually by Member states pursuant to Article X of the Statute and in accordance with the possibility foreseen in Article XIII that the Agency and the Member may agree that the Agency need not pay reimbursement for items furnished to it.²² If as usual, the offer is made after the Board has approved the technical assistance project for which the item in question can be Gifts of Services, Equipments and Facilities.²³

Unlike voluntary contributions of money for which an annual target is set on the basis of which the Operational Budget is established the possibility that voluntary contributions will be

22. section 16.8. pp.403 (SZASZ, p.c.) fellowship;

23. Ibid.

received in kind is never explicitly reflected in the Budget nor are offers solicited systematically. Instead any gifts received are used to reduce the cash outlay for Regular Programme projects whereby funds are released to finance further projects whose original priority was too low to receive a cash allotment in the first instance. Gifts in kind take several forms :

(a) Free experts, provide either entirely cost free or on compensation free basis (the government covering experts salary) and the Agency meeting all other costs usually those require convertible currencies ;

(b) Free fellowship positions (whose conditions are set by the donor state) used by the Agency for the grant of type II(C) Equipment or material.

UNDP /Technical Assistance

The UN Development Programme is the principal source of additional funds for supporting projects of the same type as are included in the Agency's Regular programme, i.e. the supply of experts, visiting professors, equipment, fellowship and training courses. However, a completely different procedure is used with respect to the approval of individual budget of the projects administered by the Agency.

Country Projects

The largest part of the funds available for UNDP technical assistance are assigned by the UNDP Administrator, to the states eligible to receive assistance, through the establishment of quotas (the so called 'country target'). Within its quota each country can propose project to be administered by any of the

organization participating in the UNDP and consisting of any combination of experts, equipment (subject to certain limits)²⁴ and fellowships the total rise of UNDP country programmes administered by the Agency depends.

UNDP assistance is not restricted to the members of the Agency. Thus the non members eligible to receive such assistance can request the agency to Administer a Nuclear project in the same way as it would for a Member²⁵.

Regional Projects

A certain portion of the total funds available to UNDP has been assigned to the participating organization for regional projects. These projects are decided on by the Director General, on the basis of the interest shown and request made by the states in the area concerned.

UNDP/Special Fund

Special fund projects are based on requests by one or more states approved by the governing body of UNDP. The Agency's function in this process is the advice that it may give to the states in preparing and justifying their requests and

24. Budgeting and Financial practices of the United Nations, UN doc. ST/ADM/L.4 para 216 UNDP procedure are described and analysed in great detail in R.G.A Jackson's 'A study of the capacity of the UN development system . UN Publication DP/5 (Geneva 1969) Vol II CHAP. 5,

25. Section 13.3.1. pp. 338 (SZASZ, P.C.)

later to participate in the UNDP Secretariat's evolution on which the recommendation of the council is based. The Agency's participation in a special fund project is based on and governed by its signature, together with that of UNDP and of the states (s) concerned, of the plan of operation.²⁶

In addition to its functions as executing agents for certain Special Fund projects, the Agency has more frequently acted as Sub-contractor to organizations administering other such projects.²⁷

In such cases a contract is concluded between the two organizations, providing for the Agency to perform specified tasks (Usually involving the use of radioisotopes) and to be reimbursed for the cost it incurs.

The Regular Budget

Article XIV of the Statute prevents the financing of any of the technical assistance programme from the regular Administrative Budget, which is funded from the contributions assessed an members states. In spite of this tauter principle, there are certain marginal but significant examples of technical assistance costs charged to the regular Budget ;

26. For example plan of operation for the UN Special Fund in Yugoslavia, Signed 3 April 1963- Agency Registration No. 147; amended 19 OCT 1966 - Agency Registration No. 433.

27. GC (VIII)/INF/72; para 22.a; GC(XII)/INF/100 Annex III

Administration and Overhead

Administrative overhead expenses incurred in connection with the Agency's regular Technical Assistance Programme are borne by Regular Budget (Article XIV B.1 (a)). Since an important part of the Agency's technical assistance programme is financed by the UNDP, it can be assumed that an approximately proportionate part of the administrative and overhead cost of the programme is attributable to projects financed from this source.

(b) Special Missions

The cost of special missions, whose functions relate primarily to the technical assistance programme, have uniformly been charged to the Regular Budget. The first such visitation were called preliminary Assistance Mission (PAMs) and the ostensible but by no means unconverted ground for charging their cost to purposes was that preparation of Agency project by aiding Member States in formulating requests for technical assistance. Certain later missions called by descriptive names such as: power survey Mission, training survey mission library workshop mission etc were also without objection paid from the Regular Budget.

Assistance by staff members

A by no means negligible amount of technical assistance is rendered directly by staff members, working either at Headquarters or visiting in the field. Regardless of the function they perform, their emoluments continue to be charged to the Regular Budget and only their travel and subsistence cost may

be charged to the Operational Budget;²⁸ only if the assignment falls under a Special Fund project can the salary be covered from Executive Agency Overhead Cost (EAOCO) payments from UNDP/SF.²⁹

Assisted States

One of the Classical characteristics of technical assistance is that the recipient should not be required to incur any expenses payable in foreign currency. However, it is almost equally accepted that the assisted state should in general pay for all costs that can be covered in local currency. It is applied by the Agency both to UNDP and to Regular Programme projects. Only for very poor countries does UNDP occasionally waive the requirement of the payment of local costs but if it does so the Agency usually follow suit. Thus the assisted state must generally pay the local costs in connection with both expert and equipment projects.

Other States

In September 1969 the Board of Governors approved an agreement with the Government of Sweden whereby the latter would furnish through the Swedish International Development Authority (SIDA) funds to implement agreed projects of assistance in developing Member States.

28. The significance of this development is recognised and approved in an expert report recently published by the UN Secretary General.

29. Sections 18.2.4 pp.471 and section 18.2.5.1. pp.472.

Types Of Assistance

1) Experts: The supply of experts is one of the principal ways in which technical assistance is granted. They may be provided under Board approved "Regular" technical assistance projects or under UNDP/TA projects. In addition some regular staff members are on occasion detailed to provide expert assistance while their salaries continued to be paid from the Regular Budget.

Experts are normally employed as staff members and are subject to the Provisional staff Regulations and to the special staff rules governing the conditions of services of Technical Cooperation Experts.³⁰ Those engaged for only very short periods or those whose services are made available on a cost-free basis are given Special Service Agreements.

Experts submit periodic and final reports to the Agency and to the assisted state. The final reports are routinely made available to other governments, unless the State concerned objects within two months.³¹

2. Exchange Arrangement-Visiting Professors Visiting professors provided under "exchange arrangements" are for all practical purposes experts provided on the same basis as that of the experts. In practice the only difference is that exchange arrangements under the regular programme are not submitted to the Board for approval in the same way as experts projects are.

30. GC(x)/INF/87/72, para 15.

31. This practice is apparently based on Revised Standard agreement, Art. II.2.3.

Equipment

The extent to which equipment should constitute part of technical assistance projects has been the subject of chronic controversy- not only in the Agency but within the UN system generally. The developed states (which largely control the Board) make available both the bulk of the actual assistance as well as most of the voluntary contributions (to the Agency's General Fund as well as to UNDP) from which the assistance is provided and desire to fund the technical assistance programme on the transfer skills (eg, through the provision of experts and the training of fellows) with equipment to be provided only as an ancillary part of such training projects (e.g., for other purposes should be obtained from capital development funds.

The receiving countries (which can control the General Conference) on the other hand, often see in technical assistance the potential of supplementing their scarce development resources (particularly foreign currency) by obtaining items of permanent value-even though thereby the amount of training and experts advice they receive is reduced. The contradictory views are particularly sharp in relation to the Agency's programme, since atomic energy projects typically require expensive and complicated equipment. In 1955 the Technical Assistance Committee of ECOSOC requested the organizations participating in EPTA to give special attention to "providing adequate amount of equipment and supplies as integral part of technical assistance projects".³²

32. UN doc. E/2779, para 8 (ECOSOC off.rec. 20th session Annexes).

In the resolution by which the General Conference first request the Board to establish rules for the provision of technical assistance, it called attention to this ECOSOC request and also asked the Board to take account of "The special character of the Agency's operations".

Under UNDP/TA projects the Agency can only indirectly influence the proportion of equipment to be provided, since the distribution of the assistance to be provided is determined by each requesting Government, subject only to possible veto by UNDP if the applicable guidelines are too flagrantly disregarded.³³

One type of "all equipment" project of which several have been approved relates to the supply of scientific documentation (books, back-number periodicals, current subscription to periodicals), and ancillary equipment (microcard and film readers). At the request of the Board, the Director General after consultations with UNESCO, established a set of criteria for the examination of requests for the provision of Technical Assistance in Scientific Documentation.³⁴

The Agency usually retain title to any equipment it supplies under technical assistance projects during the execution of the project. At the end of that period, the title of the equipment is almost always transferred to the Government by means of an exchange of letters, by which the state is required to assure the continued peaceful use of the equipment, its avail-

33. Ibid

34. GC (VIII)/INF/100, Para, 13.

ability for future technical assistance projects, and the application of health and safety measures.

Fellowships

Fellowships are provided both from UNDP/TA and UNDP/SF funds and from Agency resources within its Regular Programme, and in the latter case both from funds and from gifts in kind (i.e., offers a scholarship). Fellowship paid for in cash are called Type I and those made available by members states are called Type II. The fellowship is based specially on Statute Article III.A.4, by which the Agency is authorised to "encourage the exchange and training of scientists and experts in th field of peaceful uses of atomic energy".

In March 1958 the secretariat proposed a set of preliminary rules to the Govern the award of scholarship and fellowship by the Agency. Theses established the differentiation between Type I & Type II, indicated the several types of training that the Agency would support, established the requirement that nominations must be received through governmental channels and included guidelines for payment of travel costs. The Board immediately approved these rules.³⁵

The 1958 preliminary rules and the 1963 resolution and decisions, as well as the several Secretariat "Standards" formulated pursuant to their requirement, still constitute the legal framework of the fellowship programme.

35. GC (II)/39 para 127.

A number of joint projects and similar arrangements in which the Agency participates contain its undertaking to allocate a certain number of fellowships to the projects either in order to facilitate the supply of outside personnel to the project or the exchange of persons among the participating states; these fellowships sometimes constitute the principal material contribution made by the agency to the project.

The Agency also grants fellowship for study in some of its even activities, such as the laboratory or the Theoretical Physics Centre. In that event these, of course, is no "host state".

5. Regional Projects

Regional projects, such as training courses, study items, regional advisers or seminars, may be financed from the Agency's Regular Technical Assistance programme or more usually from funds for regional projects made available by UNDP/TA. Proposal for such projects may originate within the Agency's Secretariat or with member state in a particular region. In either case the plans for any such projects are communicated to all states in the region under EPTA principles, which are now applied by UNDP and were always applied to the Agency's regular programme. A regional project only carried out if substantial support is shown- evidenced by indications of expected participation from states willing to be host and from several other states. No Board approval is sought for these projects.

6. Mobile Radioisotopes Laboratories

Early in 1958 the United States donated to the Agency two Mobile Radioisotopes Laboratories designed for the conduct of small course in the uses of Radioisotopes. These facilities were housed in a truck which could be shipped over large distances or travel overland under their own power within a country or region.

In March 1959 the Board acting on a recommendation of its Technical Assistance Committee, approved a model agreement to be concluded with the states in which one of these Mobile Laboratories was to be used; it was based as closely as possible on the EPTA Revised Standard Agreement in use at the time.³⁶

7. Special Missions

One type of technical assistance financed for the most part from the regular budget of the Agency is a variety of special missions dispatched on various technical assistance assignments.

Each such mission is made up of a group of experts, consisting in part of Agency staff members and in part of consultants, either hired adhoc or made available on a cost free basis by member states.

36. Neither the model agreement nor any of the actual instruments concluded were ever published, nor registered with the UN, However these agreements were registered by the Agency. eg, Agreement of 30th April 1960 for the use of the IAEA Mobile Radioisotopes Lab.

The purpose of each missions is to give some direct assistance, to identify fields and areas where the Agency's programme might be expanded, eliminated or improved and primarily to stimulate the states visited to presents request for technical assistance or perhaps regular art. XI projects to the Agency directly or through UNDP.

No formal agreements are concluded with states to be visited on a mission, through in the prior correspondence an undertaking is obtained from each host to pay certain locally incurred costs. The Board's approval is obtained for the dispatch of every preliminary assistance mission and of most other major missions. However it is the Director General who is authorised to dispatch the minor missions, within the budgetary resources available to him.

Formal reports are prepared on every preliminary assistance mission and copies of these are made available to every member state. In addition summaries of these reports are presented to and considered by the Board. The reports relating to other mission are generally not considered by the Board, nor are distributed as widely unless they are of such general interest that their publication in the technical report series is considered necessary.

Reports & Review

Guiding Principle no. 20 require the Board to review annually the entire technical assistance programme of the Agency regardless of how it is funded on the basis of a report submitted by the Director General.

CHAPTER -III

AGENCY'S SAFEGUARDS REGIME

What are safeguards ?

If one were a student of the English Language one would be tempted to write a Scholarly essay on the increasing use of the word "Safeguards".

The purpose of any safeguards or System of Safeguards is to prevent Some unwanted event or at least to reduce the likelihood of its occurrence - an umbrella is a safeguard against getting wet.¹

The safeguards of system of Safeguards described in this work are concerned with detecting the diversion of nuclear material from legitimate peaceful uses to military purpose. The safeguards system described here are primarily systems for keeping track of nuclear material. Accounting methods supplemented by sampling, analysis and inspection are used to detect diversion of nuclear material for authorised use.

INTRODUCTION :-

More than 20 years ago, during the discussions leading to the founding of the IAEA and the adoption of first Statute, serious concern was expressed that the promotional

1. Willrch, Mason, Ed. International Safeguards and Nuclear Industry (John Hopkins Univ. Press, 1973) p. 7.

activities of the IAEA might also lead to an undesirable

spread of nuclear weapon capabilities. It was agreed that the IAEA should be authorised to complement its promotional activities by adopting appropriate control measures. The provision of these control measures - normally called international safeguards or IAEA Safeguards - was embodied in the Statute of the IAEA and reflected in all its project agreements.

The applications of IAEA safeguards, however, was not limited to its own projects. Under its Statute the agency can also assume safeguards responsibilities whenever this is requested by a member State (unilateral submission) or whenever this is foreseen in bilateral agreements for co-operation between states in the nuclear field (Safeguards transfer agreements). In order to standardise IAEA safeguards, to make them universally applicable and to improve their effectiveness, guidelines for their implementation were developed and finally approved by the IAEA Board of Governors in September 1965 (The INFCIRC/66/Rev. 2). Due to the fact that the system was developed to enable the Agency to apply safeguards to its own projects or to projects promoted under bilateral agreements for co-operations in the nuclear field, which cover as a rule an individual facility or limited number of facilities, the system was primarily facility-oriented.²

2. SIPRI, 'Safeguards Against Nuclear proliferation' (Almqvist & Wiksell, Stockholm, 1975) p. 6.

As the industrialized countries would require no as-

sistance from the Agency, it was feared That Agency controls were really meant to be established over nuclear industries in the developing countries while the industrialised world, which had the real capability to embark on a weapons programme, Would escape controls. Brushing aside these fears and anxieties, the safeguards document was imposed through the force of a brute majority. This was a period when the U.N. had a majorly of industrialized countries and their allies.

The NPT and safeguards :-

A new situations was created, however, when in March 1970 the Non - Proliferation Treaty (NPT) came into force. by 1978 this treaty had 101 non-nuclear weapon state-the USSR, the UK and the USA. It has proven since to be a most important international instrument against the proliferation of nuclear weapons. The treaty specifies, among other things that each non-nuclear weapon state party to the treaty undertakes to conclude an agreement with the IAEA Submitting all nuclear materal in all peaceful nuclear activities to IAEA safeguards. The structure and component of these agreements between the agency and states, required in connection with the NPT, were discussed in 1970 and 1971 by the safe-guards committee³, which advised the Board of Governors on

3. The chairman of the committee was Dr. Kurt Waldheim, who soon there after was elected Secretary-General of the U.N.

safeguards-related questions. The report of the committee (IN-FCIRC/153) was adopted by the Board as the basis for negotiating agreements required by Article III of the NPT.

Under the NPT-type safeguards agreements the agency is responsible for independent verification of compliance with the provisions of safeguards agreements. The wide international acceptance of these obligations has caused a major shift in the Agency's safeguards activities from a facility-by-facility approach to a statewide fullscope, nuclear material-oriented approach.⁴

The statute specifies the main methods of control on which the Agency is to rely in carrying out safeguards but allows each of these methods to be applied only to the extent relevant, a determination that must be embodied in an agreement with the state concerned.⁵ The IAEA merely creates a framework for controls within which member states can decide whether to submit and if so to what controls.⁶

The IAEA is not a party to NPT. nor was it formally consulted on the formulation of that instrument. The Agency is thus under no legal obligations (except under its statutory charge to cooperate with United Nations disarmament

4. Ibid.

5. IAEA Statute, Articles II, III.A. 5, IIIB.2, XIF.4 and XII.

6. Szasz, Paul C., "IAEA Safeguards, In Willrich Mason (ed) International Safeguards and Nuclear Industry. 75.

efforts) to carry out any function foreseen for it in that treaty. The NPT requires non-nuclear weapon parties to commence negotiating safeguards agreements with the Agency within 180 days of the entry into force of treaty (or no later than upon ratification) and to conclude such agreements within eighteen months of the initiation of the negotiations, which is mentioned in NPT Article III.4.

The NPT introduced the novel provision that only materials and facilities obtained from abroad were subject to control provisions but indeed the entire civilian nuclear programme, including indigenously produced materials and facilities. These NPT controls are territorial in character. The pre-NPT Controls could be rationalised as a private to be paid for international commercial transactions; but the NPT controls amount to an abridgment of national sovereignty.

The discussions on the control provisions at the treaty led to a regrouping of forces. While the U. S. and Canada advocated stringent controls, West Germany and Japan had expressed concern over the possibilities of industrial espionage and wanted controls to be sensitive to commercial competitive advantages. The industrially advanced nations were not prepared to give up a disproportionate share of tangible benefits from the commercialization of civilian nuclear power merely to ward off some distant and intangible dangers of diversion for military purpose. They insisted on a sharp decoupling of the military and peaceful occupations

of nuclear energy and maintained that nuclear weapons states should not be allowed to have commercial advantages in the civilian nuclear field just because there was inequality in the military sphere.⁷

NPT safeguards agreements with Non-Nuclear Weapon States :-

Almost immediately after the IAEA Board had addressed the Negotiating Instructions to the Director General, the first two NPT Safeguards Agreements were negotiated and subsequently approved by the Board in June 1971.⁸ Nineteen further almost identical agreements were approved by the end of February 1972.

Nothing in the IAEA statute requires the Agency to restrict its safeguards to member states⁹, nor does NPT require its parties to join the Agency or exempt parties nor IAEA members from the obligation to submit to Agency safeguards. Consequently while some of NPT Safeguards Agreements provisions be somewhat different from those entered into by members¹⁰. In other respects, non-members are to be treated

7. Zuberi, M. Nuclear Safeguards; The servitudes of Civilian Nuclear Technology in "Nuclear Myths and Realities" ed. K Subhramanyan IDSA . 1981 P. 6.

8. With Finland (IAEA Press Release PR 71/25 and document INFCIRC/ 155 and add. 1) and Austria (PR. 71/26 and INFCIRC/156)

9. Szasz, P. C. Law and Practices. Section 13. 3.2.

10. IAEA document INFCIRC/153, par. 15 (b)

on par with members, though despite their right to participate in Board debates of any safeguard questions raised by them.¹¹ (M. Nuclear Safeguards: The servitndes of Civilian Nuclear Technology, in Nucleav Myths and Realities 'ed., K. Subhra manyam IDSA, 1981, p.6)

The NPT cannot require non-parties to submit to Agency safeguards and to conclude agreements to that effect. However, it can and does not prohibit parties to the NPT from transferring nuclear items for peaceful purposes to any non-nuclear weapon state except under Agency safeguards¹²

Subsidiary Arrangments :- For practical as well as for political and legal reasons to specify in some consensual instrument the specific control measures to be applied to actual materials and installations, is necessary. The agreements thus require the state and the Agency to conclude Subsidiary Arrangements in which these important details can be set forth.¹³ A number of provisions of the negotiating Instructions and thus of the Agreements themselves, specify matters to be covered by these Arrangements¹⁴ This device

11) Ibid. par.21 ; see also Board Provisional Rule of Procedure 50 (IAEA document Gov/INF/60.

12) NPT, Article III.2.

13) IAEA Doc. INFCIRC/153, pars. 39 - 40. On July 20, 1970

14) Ibid. paras 42, 46, 60, 64(b) , 65, 68 (ab) 5 (dc),76 (ac).

has long been part of the Agency's safeguards practice¹⁵. The Director General submitted to the safeguards Committee (1970) a tentative outline of the "Structure and Contents of Subsidiary Arrangements under [NPT Safeguards Agreement].

In the light of this purpose and following past practice, the arrangements will be concluded on an administrative level between the IAEA Director General or Inspector General and the state concerned, probably without prior or subsequent submissions to the Board of Governors.

Non-NPT Safeguards Agreements :-

As of June 30, 1972, some 49 non-NPT-IAEA safeguards agreements were in force. Eighteen of these were Project Agreements,¹⁶ Providing for the transfer through, or with the assistance of, the Agency of nuclear items (mostly nuclear materials and reactors) for specified approved "projects" in member states and subject to safeguards as provided in the Agreements.¹⁷ Two were non-NPT safeguards

15) Szasz, Paul C. Law and Practices Section 21.5.7.3

16) For example, Agreements between IAEA and Govt. of Pakistan for assistance by the Agency to Pakistan in connection with the Establishment of a Nuclear Power Reactor Project, 650 UNTS 243, reproduced in IAEA document INFEIRC / 116p.2

17) For example, Agreement between the IAEA, the Govt. of Israel and Govt. of the USA for Application of safeguards, 573 UNTS. 3, reproduced in IAEA document INFCIRC / 84.

submission agreements for receiving assistance and the other Taltelolco, safeguards agreements with Mexico.

If the states in which the Agency is exercising controls pursuant to any of these existing agreements enter into NPT safeguards Agreements with the Agency, these will require the suspension of safeguards exercised by the agency under the other arrangements. which is specified in the para 24. of IAEA document INFCIRC / 153. However, the latter are not entirely superseded by the NPT Safeguards Agreements and thus may still restrain the use of nuclear material for military purpose prescribed by the IAEA statute or by supplier even though these military uses are not barred by the NPT or by the new safeguards agreements.

Non-nuclear weapon states that do not become parties to the NPT may be parties to agreements providing for Agency Safeguards. In particular, nuclear items supplied to them by NPT parties must be subjected to controls at least as severe as under the NPT.

Nuclear weapon states may be subject to IAEA safeguards, for example under the reciprocal provisions of certain trilateral safeguards Transfer Agreements.

But the curious fact is that the contract system is directed at the nuclear energy industry of the non-nuclear weapon states. It can be said that all measures of nuclear disarmament, such as a Comprehensive Test-Ban, on site inspection and a halt on the production of fissionable material for weapon purposes. which nuclear weapon states have been unable

to agree upon among themselves, have been improved on non-nuclear weapon states.

Until 1975 nuclear proliferation was supposed to signify the acquisition of nuclear weapon by additional materials. This is no longer a definition acceptable to the supplier countries. Not only nuclear weapons but also enrichment and reprocessing capabilities have become forbidden fruit, which cannot be legitimized even by acceptance of international controls.

This reinterpretation of the meaning of non-proliferation and the consequent benefits about the effectiveness of safeguards undermines the very foundations of the nuclear non-proliferation treaty. Stringent export controls, on the basis of arbitrary criteria fixed by the advanced countries in recent conclaves and imposed through bilateral and multilateral measures, negate the basic bargain of the treaty. The extra-ordinary attempt to coerce non-signatory states to accept the newly defined NPT standards ("full scope safeguards" means precisely this) is a novel idea and impertinent demand to make the treaty universal in character. This is being demanded at a time when the very foundations of the treaty have been undermined. Never in history have non-signatories to a treaty been asked to subscribe to its terms. Already by definition is a contractual arrangement accepted by those who have, after due deliberation, chosen not to accede to it. The intolerable demand for the acceptance "fullscope safeguards" remind one of what Dr. Homi

Bhabha once said " It is as if not only the receipt of aid were to be put under bandage but his children, his grandchildren and all succeeding generations for ever and ever".¹⁸

Taltelolco Safeguards :-

A special type of safeguards submission agreement is called for by the 1967 treaty for Prohibition of Nuclear Weapons in Latin America (the Taltelolco treaty).¹⁹ In brief each party to the Taltelolco Treaty must, within period identical to those specified in NPT, enter into negotiations with the IAEA and conclude with it a safeguards agreements. Under such an agreement, the Agency is to apply safeguards to the state's nuclear activities for the purpose of verifying compliance with the treaty obligation to "use exclusively for peaceful purposes the nuclear material and facilities which are under [its] jurisdiction and to avoid any direct and indirect dealings with nuclear weapons. Though basic requirements for IAEA safeguards under both the Taltelolco and Non-Proliferation treaties are similar, although they differ with respect to non-weapon military nuclear activities and peaceful nuclear explosives. Therefore, various possibilities would in principle be open to states parties to both treaties :

18) Zuberi, nuclear Safeguard. p. 19

19) 634 UNTS 281, reproduced in the United Nations and Disarmament 1945-70, Appendix VIII, and in McKnight, Atomic Safeguards, Annex. 8.

(1) a type of safeguard agreement would be formulated to cover both treaties, with only minimal modifications of the NPT safeguards Agreements; (2) separate safeguards agreements could be negotiated for each treaty, but the Tlatelolco-related safeguards could be suspended as long as these relating to NPT remained in force; (3) a standard NPT safeguard Agreement could be concluded and supplemented by a protocol specifying that the safeguards thereunder also apply to the Tlatelolco obligations; (4) the Tlatelolco parties could agree among each other to suspend the Tlatelolco obligation to enter into safeguards agreement for states that enter into a NPT type Safeguards Agreement with the IAEA. This function was evidently rejected by the General Conference of the Agency for the Prohibition of Nuclear weapons in Latin America (OPANAL) which urged its members to initiate and conclude negotiations with the IAEA as soon as possible.

The implementation of Safeguards :-

It should be emphasised that INFCIRC/153 provides for the application of Agency Safeguards to all nuclear materials for all peaceful nuclear activities in a State. To verify that this material is not diverted to nuclear explosives (paras 1,2), it's more technical statement of objectives; however, adds "or for purposes unknown" (para 28). Finally, the Agency is authorised to report to its members and to the General Assembly and the Security Council of the

United Nations when the Board of Governors "finds that the Agency is not able to verify that there has been no diversion" (para 19). Material accountancy complemented by containment, surveillance and inspection is used to achieve these objectives.

Containment

Physical barriers, e.g. walls transport flasks, container, vessels etc., which in some way physically restrict or control the movement of, or access to, nuclear material, to information related to the quantities or locations of nuclear material and to IAEA surveillance devices²⁰.

Surveillance :-

This includes collection of information through devices and/or inspector observation in order to detect undeclared movements of nuclear material, tampering with containment, falsification of information related to location and quantities of nuclear material and tampering with IAEA safeguards devices. ²¹.

20) IAEA - safeguards Glossary, 1900, IAEA/SG/INF/1, pp. 28-29, p. 50 and p. 55.

21) Ibid.

Inspection :-

A set of on-site IAEA activities to verify that the way in which nuclear material, equipment or facilities subject to safeguards comply with the provisions of the agreement. The activities may include the review of design information to ensure that safeguards can be effectively applied, the examination of records of nuclear material and comparison with the corresponding statements by the state to the IAEA, inventory and flow verification, the installations and servicing of containment and surveillance devices.²² INFCIRC/66 allows some unannounced inspections, and INFCIRC/153 allows some inspections that are unannounced and planned on a principle of random sampling. Although unannounced or "surprise" inspections are permitted, Fischer and Szasz suggest that their usefulness could be limited.

The implementation of IAEA safeguards requires the establishment of a report and record system base on measured nuclear material flow and inventory data and on a material balance area (MBA) concept with one or several MBAs for each nuclear facility. The responsibility for this system of nuclear material accountancy and control lies with the national authorities. Comprehensive recommendations for establishing and operating such a system are under prepara

22) Ibid.

tions in the IAEA. Based on verified design information, safeguards procedure for each individual facility are developed and agreed upon by the IAEA and the national authorities.

The national authorities submit periodic reports on inventory changes, inventory taking and material balances for each material balance area. The IAEA Safeguards Department evaluates these reports for completeness and correctness and sends its inspectors for verification.

At the facility the inspector compares the reports with relevant internal records and source data to verify that the reports are not falsified in order to conceal diversion, and independently verifies the presence of the reported quantities of nuclear material. After return to headquarters, the inspection reports are evaluated and the conclusions of the Agency's verification activity are transmitted to the state. These technical conclusions are statements, in respect of each material balance area, of the amount of material unaccounted for (MUF) over a specific period, giving the limits of accuracy of the amounts stated. Specific information relating to the implementation of IAEA safeguards is given annually to the Board of Governors.

Sensitive Nuclear Material :-

Material accountancy requires measurement of material inventory and the flow of material inventory and the flow material in and out of material balance areas. INFCIRC/153 specifies accounting with respect to amounts of uranium and

plutonium elements as well as U-235 and U-233. 23).²³

Nuclear weapons contain fission-energy components fabricated with plutonium, Highly Enriched Uranium (HEU-Uranium containing 20% or more of the isotope Uranium-235), or Uranium-233. Thus, the safeguards "sensitivity" is established in relation to the ready availability of plutonium or HEU and to the ability to produce and process them. ²⁴

Nuclear weapons can be fabricated using plutonium containing virtually any combination of plutonium isotopes, according to advice given by nuclear-weapon states. Plutonium containing very high percentages of the isotopes plutonium 239 is better suited than plutonium containing 10% or more of the isotope plutonium 240.

However, according to some inspection experts even reactor grade plutonium can be used for the manufacture of nuclear weapons, capable of substantial explosives yields. But this is now challenged by other experts, especially from Japan.

Only a small amount of HEU remains in peaceful nuclear activities, primarily in research reactors fuels. Very little

23) Baeckmann, A.Von, IAEA Safeguards Technology, in SIPRI, Nuclear Energy and Nuclear Weapon Proliferation, London Taylor and Francis Ltd. 1979), p. 181

24) T.E. Shea and K. Chitumbo, IAEA Bulletin, March 1993, Vienna, p. 23.

Uranium - 233 exists. 25 Other nuclear materials - for example natural uranium - may be critical to the operation of an isotope production reactor or enrichment plant. The situation also could arise where safeguarded heavy water might be required for the operation of an unsafeguarded research or power reactor in a state not having a comprehensive safeguards agreement, and the reactor, could be used to produce plutonium or Uranium-233.

These measurements are performed by the plant operator who reports the results through the national authorities to the IAEA for independent verification. Methods used for verification measurement primarily aim at determining the quantities of Uranium and plutonium as elements and of the specific isotopes U-233 and U-235.²⁶

Diversion Strategies :-

The strategies and associated concealment schemes which might be used by a potential diverter include :-

- The removal of nuclear material subject to safeguards :- This could be done with or without falsified records and reports (e.g., understatement of receipts or overstatements of shipments, overstatement of discard and/or retained wastes, or overstatements of inventory declarations); with or without the substitution of falsified or partially falsified material; or with or without safeguards material being borrowed from other facilities.

25) Ibid.

26) Baeckmann, A.Von, SIPRI 1979, p. 182.

The misuse of safeguarded facilities :-

This could be done, for example, through undeclared production of plutonium or uranium-233 in research or power reactors; configuration and production of HEU in low enrichment facilities; undeclared reprocessing or scrap recovery; or undeclared heavy water production or scrap recovery.

In states not subject to comprehensive safeguards agreements, reproducing or misusing equipment that is subject to safeguards.

Verification techniques should, as far as possible, be simple, tamper-resistant, accurate and reliable. The simultaneous and sufficient accomplishment of these four objectives is not always feasible.²⁷

Under the auspices of the Canadian safeguards support Programme, Atomic Energy of Canada Ltd. has developed several pieces of equipment for the use of IAEA inspectors. Among them is the ultrasonic random coil seal which is designed to be used underwater on stocks containing spent Canadian-Deuterium-Uranium (CANDU) reactor fuel.²⁸ They are installed using a long rod and can be routinely checked by inspectors using an electronic probe and a special seal Pattern Reader. Each seal contains a

27) Ibid.

28) James F. Keelly. Arms Control Verification : IAEA Safeguards as a model for verification, Occasional Papers No. 1, Ottawa, Canada. September 1988. p.

wire coil. When an ultrasonic wave is sent to the seal, the coil creates a unique reflection pattern which is destroyed if the seal is tampered with or removed.

Safeguards Activities :-

The safeguards measures applied at sensitive nuclear facilities are based on a layered combination of activities to cover the different groups of diversion strategies.

The activities include :-

Examination of design information and notification of the physically inventory :-

- * confirm a facility's appropriateness for the declared peaceful nuclear activities;

- * establish that the information is complete, accurate and consistent, and that the facility is constructed, operated, and maintained in accordance with the information provided.

- * serve as the basis for the design and implementation of a safeguards approach for the facility that is intended to detect diversion or facility misuse; and

- * serve as a reference basis against which comparison will be made over the life of the facility to establish normal expectations and abnormal or anomalous conditions.

Activities to cover verification of inventory changes and timeless requirements.

These include :-

- * extensive use of containment and surveillance (c/s) measures at facilities;

* depending on the scale and complexity of a facility, the use of dynamic c/s systems to monitor plant operations within process areas. These systems may incorporate plant measurement systems in combination with engineering flow sheet predictions.

* compilation of operator data and verification of amounts and locations of safeguarded material flows, storage inventories and process inventories during plant operation to permit near real time accountancy (NRTA) balances over separate and combined segments of the plant.

* computation of material balances (an element of nuclear accountancy) for sub campaigns at large processing plants corresponding to contiguous operations carried out for individual clients.

Verification of the physical inventory :-

Once every year, plant operators are required to shut down plants, clean out the nuclear materials and take physical inventory. The IAEA verifies the operator's declared physical inventory by appropriate non-destructive and destructive analysis according to random plans.

Evaluation of the material balance :-

At the end of each physical inventory verification, the material balance over a 1-year (maximum) period is evaluated and verified. In addition, cumulative material balances are computed over the life of the facility to ensure long-term stability.

Verification of initial inventory :-

Verification of the initial inventory is done to establish that the state's initial declaration of facilities, equipment, and materials subject to a safeguards agreement is complete and accurate.

Safeguards implementation will depend on whether or not a facility has been built or has been operated before safeguards are applied initially or re-applied when relevant conditions recur, as may happen for plants in non-nuclear weapon states that are not bound by comprehensive safeguards agreements.

The investigations carried out prior to implementing safeguards under such circumstances resemble a form of nuclear archeology²⁹. They combine extensive examinations of plant's historical operating records and analysis of trace samples from within and around a facility to confirm the operating records.

For verification purposes, two kinds of measurement, technique are normally employed; non-destructive assay techniques (NDA) and chemical analysis (CA) of representative samples, combined with a determination of batch weight. Although NDA techniques can be used during inspections. NDA techniques for determination of nuclear materials³⁰ are as a rule based on measurement of characteristic decay features of the material

29.) IAEA Bulletin, March, 1993, p. 25.

30. Baeckmann, A. Von, SIPRI, p/. 182.

(passive techniques) or no measurement of induced radioactivity (active-technique). In addition, absorption or reflection of nuclear radiation or x-ray is also used for analysis.

The most important NDA instrument used by IAEA inspectors is the 3 AM-II (stabilised assay meter) - a relatively simple two channel Y-spectrometer used, as a rule, together with a sodium iodide detector. By proper setting of the two channels, uranium, uranium-235 or plutonium can be identified and semi-quantitatively determined with this system.

Most of the instruments are portable so that the inspectors may carry them from one facility to another. Although special transport containers have been developed for safe shipment of equipment-mostly as air-freight-damage during transport sometimes creates considerable difficulties, particularly with respect to the intrinsic germanium detectors.

The most simple method for verifying the presence of at least minimum quantity of special fissionable material in a small research reactor in operation can be done by observations of the Cerenkov glow.³¹

Further development with respect to the use of NDA techniques for safeguards purposes is directed towards: a) simplification of these features which facilitate infield application

31. Ibid, p.183.

(for example, portability, robustness, ease of operation, maintenance and repair, and so on); b) simplification of calibration procedures and minimization of physical standards requirements; c) investigation of scope and limit of application; d) development of procedures for proper interpretation of results; e) provision of adequate training of inspectors in the use of NDA instruments; and (f) investigation of the possibility to utilise installed instrumentation for international safeguards purposes. In the open part of the fuel cycle, that is in those facilities in which nuclear material is handled in bulk form rather than in sealed item form, destructive analysis is preferred for verification purposes. Also sample transport and storage require special attention. The characterisation of standard materials used for calibration of the non-destructive assay technique also requires very accurate chemical analysis. To fulfill the chemical analytical demands of IAEA safeguards, the Agency operates its own safeguards analytical Laboratory (SALO at Seibersdorf, near Vienna. ³²

Samples taken from dissolved irradiated fuels are analysed exclusively by mass-spectrometric isotope dilution analysis. Because of the extremely high radiation level of these materials, only diluted samples of spent fuel are shipped to the Safeguards Analytical Laboratory.

To cope with peak sample loads and to maintain continuous

32) The safeguards Analytical Laboratory: its functions, and analytical facilities, IAEA Bulletin, vol. 19, No. 5 October 1977 pp. 38-47.

control over the performance of SAL, a certain number of samples are routinely sent for analysis to other laboratories in member states. SAL also participates in various international inter-comparison exercises and international analytical quality assurance programmes.

Seals are widely applied by inspectors in order to verify the integrity of containment. Several different types of seal have been developed during recent years, such as the ultrasonic, rondon Coil seal, mentioned earlier in this chapter, Metallic and fibre optic seal are also used to detect tampering with the sealing wire. Pressure-sensitive paper seal labels are used for short-terms application.

Optical surveillance is primarily used to verify the correctness of reports and records regarding spent fuel movements. Various types of single-frame moving cameras and still cameras have been developed for this purpose. Super 8-mm movie cameras with specially fitted quartz timers have proved to be most suitable in many cases.

Closed circuit televisions systems (CCTV) with remotely controlled cameras, that are used for monitoring, can take picture capacity is significantly higher. The recorded pictures can be viewed on site without any delay, and so on. But their high price, the need for maintenance by experts, insufficient reliability in difficult environmental conditions, and their bulk nature, have limited their use.

For special safeguards purpose, several specific monitors have been developed. These include tamper - resistant spent

fuel bundle counters used to register the number of spent fuel verifiers used for the detection of substitution of spent fuel elements by dummies, reactor power monitors based on a track-etch technique, sensitive neutron detectors used for verification of records on reactor operation, and passive gamma/neutron detectors used to detect the undeclared removal of nuclear material through small openings or ports.

Anomalies :-

Anomalies are not necessary proof of diversion : they are simply unusual occurrences that could indicate a diversion. They could also arise through inaccuracies in accounting system plan operation practices, accidents, or other sources, They may in a sense, be creations of a safeguard system itself. Some, such as broken seals or instrument malfunctions, would not exist in the absence of a safeguards system. The Remote Continuous Verification System (RECOVER), developed by the Agency as a means of monitoring the functioning of some containment and surveillance devices would be as valuable for monitoring instrument malfunctions as for its possible, real time protection against tampering other anomalies such as significant levels of Material Unaccounted For (MUF), depend on what levels are deemed significant by the safeguards system, and thus reflect appreciations of risk as well as limits of technical sensitivity.

Assessing anomalies is both a technical and a political matter Technical judgments will be required regarding the qualities of various measurements, counting data handling and analyti-

cal procedures. The safeguards systems must be designed to avoid excessive sensitivity to trivial cases while retaining an ability to spot significant cases. Significant anomalies will be passed to higher levels in the Agency, levels which are more political in their nature. This gradual imbuing of anomalies with political qualities cannot be avoided. A safeguards system's inspections reporting, analysis and internal information-management procedures must be designed to avoid such weaknesses.

Anomalies must be interpreted before their significance is clear. Given the problems of establishing compliance in a strict sense, and assuming that states attempting diversions would try to confuse the safeguards system, even significant anomalies are likely to present considerable ambiguities. That is why allowing the Agency to report if it cannot verify compliance to its own satisfaction is important: inability to resolve an ambiguous situation may be sufficient to satisfy this condition.

Chapter - IV

CONCLUSION

The future pattern of the IAEA/NPT safeguards system and nuclear non-proliferation regime would be seriously influenced by three major events in the field of nuclear proliferation. They are (1) The discovery of Iraq's clandestine nuclear weapon programme and the subsequent destruction of its nuclear facilities as per Resolution 687 of the United Nation Security Council (UNSC) passed on April 3, 1991; (2) North Korea's refusal to allow IAEA to carry out inspection at its two non-nuclear military sites at Yongbyon near its capital Pyongyang, after having signed the safeguard agreement with IAEA on 13 Dec. 1991, its announcement on 12 March 1993 of its intentions to withdraw from the NPT, and subsequently on 11 June 1993, a day before its withdraw from NPT would have become operational its unilateral declaration of suspension of withdrawal from the treaty. Following this signing of a comprehensive accord between the US and North Korea on 19 July 1993 at Geneva defusing the crisis and latter's willingness to permit and then subsequent refusal to the IAEA inspection of the two suspected sites; and (3) Former South African President F.W. de Klerk's acknowledgment in March 1993 that his country had produced six nuclear bombs by 1989 but the devices were later dismantled.¹

1. Kapur, K.D. Foreign Affairs Report, March-April 1993 Vol. XLII Nos. 3 & 4 P. 1.

These developments have brought into focus a number of weaknesses of the IAEA safeguards. The ground reality now being that signing of the IAEA safeguards agreement and opening of nuclear facilities to periodic international inspection is no guarantee that a country will be deterred from pursuing a clandestine nuclear weapon programme. A number of suggestions have been made by IAEA Director General Hans Blix and some countries particularly U.S. to plug the loopholes of the IAEA safeguards particularly the implementation of the 'Special Inspection' provisions of the NPT/IEA model safeguards agreement INFCIRC/153 of 1971 at undeclared sites within the NPT signatory states nuclear facilities - such sites which have been excluded from the safeguards. A strong case is being made for the evolution of a process or procedure which should succeed in deterring the weapon related activities through the risk of detection.² A strong need is emphasised to expand the scope of the NPT/IAEA safeguard system which should cover all facilities as well as fissile materials.³ Presently, the Agency applies two completely different types of safeguards. They are safeguard agreement INFCIRC/66/Re.2, 16 Spet. 1968 and IAEA/NPT model safeguard agreement INFCIRC/153, April 20, 1971. One major difference between the two is the

2. Spector, Leonard, "Nuclear Proliferation in the Middle East," Orbis, Spring 1992, P. 185.

3. Simpson, John, "NPT stronger After Iraq," Bulletin of the Atomic Scientists, October 1991, P. 12.

purpose and scope of the inspections. Whereas the former lacks precision, the latter describes the activities that may be included in routine inspections. INFCIRC/66-Re-02, imposes no limitations on the access by inspectors to the facilities inspected, the INFCIRC/153, limits routine inspection to strategic points that should be specified in the subsidiary arrangements and to records. Additional access is possible under "special inspections" but only in agreement with the state concerned.⁴

When a country signs the safeguard agreement INFCIRC/66-Re.2. It gives an under-taking not to use certain items in such a way as to further any military purpose".⁵ INFCIRC/153 on the other hand, gives effect to Article III (1) of the NPT. It has the exclusive purpose of verifying that states party to the treaty do not "divert nuclear energy from peaceful uses to nuclear weapons or other nuclear explosive devices." The Gulf War revealed the inadequacies of traditional IAEA safeguards and intelligence gathering. Iraq is considered an intelligence failure because large-scale nuclear weapons activities were not discovered by the IAEA or Western intelligence agencies. Infact, Western govern-

4. SIPRI, Safeguards Against Nuclear Proliferation (The MIT Press, London, Almquest & Wiksell International, Stockholm, 1975), P. 76.

5. Statute of IAEA, Art. III A.5. Text UNIDIR, no. II P. 54. I is incorporated in he INFCIRC/66 Rev. 2 No. 4. 16 Sept. 1968 Text Appendix 4, SIRPI, Safeguard Against Proliferation, P. 95.

ments did not aggressively pursue leads about Iraqi nuclear efforts or seriously impede Iraq's nuclear programme during the 1980s. Although export controls were being strengthened by the late 1980s, the new controls were too late to stop Iraq. Despite a failure to detect the full scope of Iraq's programme, intelligence agencies knew enough before the Iraqi invasion of Kuwait to have justified some sort of intervention. But western governments were unwilling to risk the kind of political confrontation that they had with North Korea in the late 1980s and early 1990s. Tight export controls and more thorough international intelligence-sharing would undoubtedly have revealed more precise and complete information about Iraq's weapon programme.⁶

Post-war Inspections:-

Intelligence agencies have shared their carefully guarded information with the IAEA and the UNSC. These agencies have provided the IAEA and the U.N. with invaluable information from defectors, export transaction records, and analyses of high and low-altitude imagery. The IAEA action team has gone beyond the IAEA's normal safeguards approach, conducting on-site, no-notice inspections of undeclared facilities based on intelligence information. The action team also picked its own inspectors-another departure from IAEA routine. This freedom allowed the choice of experts from member states with expertise in all facets of

6. Albright David, A Proliferation Primer, "The Bulletin of the Atomic Scientists, June, 1993, P. 14.

nuclear weapons production. One team even included lock-pickers, to allow the team quick access to a secret design centre in Baghdad.

To carry out Security Council mandated long term monitoring the IAEA has begun implementing techniques to detect any resumption of the Iraqi nuclear programme. One system will monitor Iraqi waterways for chemical and radioactive effluent that might be emitted by secret nuclear facilities. Another procedure that is being implemented is periodic monitoring of Iraqi dual use equipment. Besides, the IAEA has asked the Nuclear Suppliers Group to give the team data on their exports to Iraq.

Despite months of searching the IAEA has not found a dedicated Iraqi plutonium separation programme rumoured to include an underground reactor. The rumours still persist, and periodically IAEA inspectors visit suspect sites.

Iraq's centrifuge programme is believed to have been destroyed by the war and subsequent IAEA actions. Important questions about the programme remain. The inspectors have not learned the full extent of knowledge and experience acquired by Iraqi centrifuge exports. Important portions of Iraq's foreign procurement network are only partially understood. Answering these remaining questions would settle once and for all whether Iraq has hidden significant parts of its centrifuge programme.

The existence of Iraq's calutron programme shocked the world. The West was caught by surprise when calutron research, development, and production facilities were found during the inspections process. The Iraqis had made substantial progress toward the production of significant amounts of weapon grade uranium at a

site near Baghdad called Tarmiya. However, the calutron programme was largely destroyed by the Gulf war and subsequently IAEA sanctions. Because this programme is not easy to hide, the IAEA believes Iraq is unlikely to resurrect it. ⁷

North Korea:

Another issue which has been shaking the structure of the IAEA in the recent years has been the North Korean imbroglio. North Korea had signed the non-Protiferation Treaty (NPT) with the IAEA on December 12, 1985, party under pressure from the USSR to get continuous Soviet economic and technological assistance for a nuclear reactor. However Pyongyang failed to conclude the safeguards agreement. It many probably be attributed to North's ignorance about the IAEA administration and subsequent legal obligation. From January 1989 to February 1993, North has been trying to use the safeguards agreement as a political bargaining chip towards both the U.S. and Japan and set forth the following pre-conditions for signing it. The U.S. should withdraw its nuclear weapons deployed on the Korean peninsula, the U.S. should stop the Team Spirit military exercise, and the IAEA should guarantee that North Korea can unilaterally terminate the safeguards agreement should nuclear states pose any nuclear threat against it. Besides, the IAEA should include these phrases in its standard agreement, INFCIRC "Type 153".⁸

7. Ibid, P. 20.

8. Korea Observer.

North Korea's refusal to authorise the IAEA to inspect the two previously undetected sites on its nuclear complex in Yongbyon received suspicious that Pyongyang is recently developing atomic weapons.

But the was yet to come as North Korea, on 12 March 1993 pulled out of NPT, harshly condemning demands that it open sites suspected of nuclear weapons development to international inspections. However later on North suspended its withdrawal but did not allow IAEA inspections. It had also earlier rejected a February 25, 1993 ultimatum from the IAEA giving it one month to accept a special inspection of two sites suspected of being nuclear waste dumps. North could be the first country to withdraw from the treaty.

The IAEA cannot force nations to submit to special inspections but it had said it may bring the case before the United Nations Security Council. The IAEA referring the North Korean non-compliance to the security council is a matter of technical detail, albeit important in its own way but still the larger question of how the security concern and related sensitivities of non-nuclear weapons states can be holistically met within the NPT.

Interestingly the NPT makes no provisions for assuaging the security concern of such states and nor does it forbid any action by nuclear weapons states that may be deemed intimidatory by non-nuclear states. The NPT fine prints and the guidelines for IAEA non-compliance apart, the spirit and commitment to nuclear non-Protiferation has now come under sharp scrutiny. The case of North Korea illustrates that a small (5 mega watt-electric)

reactor, large enough to produce enough plutonium for one bomb a year, can be detected before it begins operating.⁹ North Korea is believed to have started building a small reactor at Yongbyon in 1980; it began operations in 1986. The reactor based on 1950s Magnox reactor technology, has a graphite moderator and gas covering that North Korea developed indigenously.

By 1984, the U.S. had learned of the existence of this secret reactor. In the late 1980s the world learned that a large, secret reprocessing plant was being built near the small reactor at Yongbyon. In 1992 the North told the IAEA that it was a "Radiochemical Laboratory." Some who did not believe that the Yongbyon facility was a reprocessing plant thought that the North was building an underground plant elsewhere and the former was a decoy.

During the IAEA's inspection in spring 1992, North Korea admitted that it had separated grain quantities of plutonium in March 1990 at the Yongbyon plant. The North said the plutonium came from failed fuel elements taken out of its 5-megawatt electric reactor.

Based on friendly intelligence in 1992 the IAEA asked to visit a facility in the capital, Pyongyang. The North subsequently admitted that it had separated minute quantities of plutonium in 1975 in Pyongyang in hot cells provided by the Soviet Union as part of the supply of a research reactor. This plutonium is believed to

9. Albright, David, "A Proliferation Primer," The Bulletin of the Atomic Scientists, June 1993, P. 16.

have been produced in the soviet-supplied research reactor. The

facility is considered too small to be a pilot plant.

Based on analyses of plutonium and waste samples, the IAEA has concluded that the North has separated more plutonium than it has declared. By early March 1993, the IAEA had been unable to estimate the total amount of plutonium that might have been separated, and the North had refused to admit to any other separation activities. In reaction to international pressure on March 12, 1993, North Korea announced that it intended to withdraw from the NPT.

Some what surprisingly in view of the youngbyon controversy the IAEA has been assisting Pyongyang with its uranium mining programme. Because the North has two small, long-established, and non controversial nuclear research facilities under IAEA safeguards, it is entitled to IAEA assistance for its civil nuclear programme. It would be sadly ironic however if the uranium the IAEA helped Pyongyang mine turned up as fuel in the un-safeguarded reactor at youngbyon, providing fissile material for nuclear weapons.

Within 18 months of signing the NPT states must complete a safeguards agreement with the IAEA. The North failed to meet this deadline, partly because the IAEA sent Pyongyang the wrong agreement to sign.¹⁰ However the correct document was sent in June 1987, along with an 18 month extension and a deadline of

10. Andrew, Mack, "North Korea and the Bomb", Foreign Policy, Summer 1991, P. 90.

December 1988, which passed without an agreement. The North,

however blames the United States for the delays.

As the Iraqi case indicates, signing the NPT and an IAEA safeguards agreement provides no water-tight guarantee that a state is not developing nuclear weapons. In addition, as skeptics suggest, the North may well be seeking to use the IAEA Safeguards agreement issue-albeit with little success-as a political bargaining chip while continuing to advance toward a nuclear weapon capability.

The importance of IAEA safeguards for preventing a state from acquiring nuclear weapons may well have been overstated. If the North signs a safeguards agreement, IAEA inspectors will only be able to inspect facilities designated by the North not plants where covert programmes might be operating. If it suspected a clandestine programme were underway, the IAEA might demand to inspect the suspect facilities. It is doubtful, however, that the North would accept such demands. And even if the Youngbyon reactor and reprocessing plant are placed under full-scope IAEA safeguards, the North could still legally produce and stockpile plutonium there.

South Africa:

The source of weapon-grade uranium for South Africa's nuclear weapon programme was the aerodynamic process deployed at the Y-Plant at Valindaba. The plant was commissioned in 1974, began producing highly enriched uranium in 1978, and closed in early 1990.

Because South Africa has because a party to the NPT, it has had to declare its inventory of highly enriched uranium to the IAEA and agree to place all of its nuclear activities under IAEA safe-

guards. The IAEA has attempted to verify the accuracy of the declared inventory, particularly since the recent announcement by the South African Government that it had built - and destroyed - Six gun - Type nuclear weapons.

Verifying the completeness and accuracy of South Africa's declaration is important because South Africa is the first defacto nuclear weapon state that has placed its programme under international inspection this case will set important precedents for other countries such as Argentina and Bracil, who have also agreed o apply safeguards on all their nuclear materials.

To help the IAEA, South Africa has provided the agency with extensive historical production information. But the information is insufficient to eliminate all discrepancies between the declaration and the IAEA estimate. A major problem is that a record of fails (waste) a says and amounts were either not kept or were recorded inaccurately. World Inventory of Plutorium estimates that the Y-Plant produced a total of 200 to 527 kilogrames of weapon grade uranium.

The Former Soviet Union:

With the breakup of the former soviet union, concern has grown that nuclear weapons or material could be stolen and sold on an international black market. Although Russia and the former Soviet republics maintain that no weapons or fissile materials are missing, low-enriched uranium, grain-quantity samples of planetarium and radioactive sources have appeared for sale in western Europe. In one case, according to the IAEA, a sealed planetarium source was seized by Italian officials at the Rome

airport from a passenger who set off a metal detector. The sealed source was marked with the emblem Techsnabexport (USSR). It contained less than one milligram of plutonium. 11

The disintegration of a nuclear superpower has raised totally unexpected and complex problems for the non-proliferation regime. Belarus, Ukraine and Kazakhstan have promised to join the NPT as non nuclear weapon states but none of them has done it so far. Ukraine and Kazakhstan are using the nuclear weapons located within their borders as bargaining chips to get financial and technical assistance and to obtain security assurances. Nursultan Nazarbayev has pointed out that Kazakhstan is sandwiched between two nuclear weapon powers - Russia and China - both of which have territorial claims on it. Ukraine has a number of contentious issues with Russia and seems most reluctant to part with its nuclear assets. If Ukraine and Kazakhstan somehow manage to retain control over the nuclear weapons, they will become the third and fourth largest nuclear weapon powers respectively. Ukraine has 16 nuclear power plants and the nuclear test site Semipolatsk is located in Kazakhstan. Accession to the NPT would necessitate preparation of an authentic inventory of nuclear material within Ukraine - so that IAEA safeguards become operational. As nuclear installations in Ukraine were part of the Soviet-nuclear weapons complex some of the nuclear material may

11. Albright, David. 'A Proliferation Primer' P. 21.

have been used for weapons purposes. This will further complicate the time-consuming task of preparing the inventory of material in installation which have been in operation for a considerable period of time. The IAEA has not taken a nuclear test site whether its inspection arrangements.¹²

EFFORTS TO STRENGTHEN THE SAFEGUARDS REGIME

IAEA safeguards were radically novelty some 30 years ago when the first on site inspection took place. They have been instrumental in creating confidence in the peaceful nature of many nuclear programs and have constituted a sine quo non for nuclear trade.

The case of Iraq was, however, reminder of some of the limitations of the present safeguard system. It is important, therefore, to examine the evolution of IAEA safeguards and current efforts to strengthen their.

Even before the UNSC Resolution 687 and 707 were passed, efforts were already afoot for strengthening of the IAEA/NPT safeguards regime. And it is asserted that if there has been no addition to the existing number of nuclear weapons states, this to a great extent way be attributed to IAEA's safeguards system. The IAEA safeguards Committee's (constituted in 1970) recommendation marked a significant progress in the evolutionary development of legal and technical aspects of IAEA's safeguard policies, practices and procedures. IAEA safeguards, which covered all

12. Zuberi, M. 'Nuclear Arms Control' in World Focus May-June 1992, P. 6.

fissioable materials in all peaceful nuclear activities in non nuclear weapon states also included provisions relating to the timely detection of the diversion of significant quantities of nuclear material from peaceful nuclear activities to the manufacture of nuclear weapons and other nuclear explosives devices, and deterrence of such diversion by early detection. With a view to broaden the safeguard programmes of IAEA, it has been suggested that it should include: negotiations with countries to conclude agreements to place their entire nuclear programme under safeguards; extension of IAEA safeguards to nuclear weapon states to cover their civilian nuclear programmes; and continuing expansion of nuclear programmes in countries which have already placed their entire program under IAEA safeguards.¹³

The importance of the IAEA safeguards became evident during the Fourth NPT Revision conference in 1990. There was no consensus on the final declaration because of the differences between the NWS and NNWS over the issue of comprehensive Test Ban Treaty (CTBT). The conference recommended that the IAEA should be provided increased financial support for safeguards. And the supplier state agreed to insist on full scope safeguards as a necessary precondition for supplying nuclear equipment and material. They also agreed to include additional material such as Tritium in export control list; Tritium, a radioactive isotope of hydrogen is used to boost explosive power of fission weapons. The

13. Jennekens, John, "IAEA Safeguards: A look at 1970-1990 and future prospects," IAEA Bulletin, Vol. 32, 1990, P. 6.

conference recognised the importance of 'special inspections' and used unprecedented language regarding this and the other dealing with the presentation of the Agency's annual safeguard inspection report (SIR).¹⁴ The text also points to the possibilities IAEA has in case of uncertainty over the full coverage of state party's 'source and special fissionable material.' Explicit reference is also made to the rights of Agency provided for in paragraphs 73 and 77 of the IAEA/NPT model safeguard agreement INF-CIRC/153 of 1971 for NPT parties. The inclusion of this paragraph in the agreed text is assumed to have been obviously motivated by Iraq's invasion of Kuwait and the sudden attention attracted by Iraq's nuclear weapons programme.

Director General Hans Blix's proposal to Strengthen IAEA's Safeguards Regime:

IAEA Director-General Hans Blix, like a crusader launched a campaign to strengthen IAEA safeguard system after the UNSC passed Resolution 687 and the IAEA Board of Governors condemned Iraq for having violated its safeguard agreement. The fact that Iraqi could produce nuclear materials for weapons using technologies not covered by the Nuclear supplier's Cernop's list, has raised serious doubts about the future utility of both the NPT and

14. NPT/Conf. IV/DC/1/Add. 3(A) Add 3(13) and Add 3(C) See "Agreed Review Conference Language" in Australian Dept. of Foreign Affairs and Trade Background, Vol. 1 No. 23 November, 1990, P. 7-9.

the IAEA safeguard system as pillar after non-proliferation regime.¹⁵

Some of the proposals made by the Dir-cell were as follows:

1. The possible extension of nuclear safeguards not only to nuclear materials but also nuclear installations in the non-nuclear weapon states parties of the treaty.

2. The proposal also included the extension of safeguards to all non-military nuclear installations of the Nuclear weapon states. Though marginally significant it only would convey the impression that similar standards are being applied to the NNWS. In addition it is supposed to bring more "Transparency in the sensitive nuclear installations in the NWS", and probably would "facilitate the conclusion of a future agreement on the cessation of the production of fissionable material for nuclear weapons."¹⁶

3. The objective of NPT safeguards as outlined in the INFCIRC/153 is the "timely detection of diversion of significant quantity (SQ) of nuclear material from peaceful nuclear activities to the manufacture of nuclear weapons or other explosives devices or for purposes unknown and deterrence by the risk or for purposes unknown and deterrence by the risk of early detection."¹⁷

15. Simpson, John, "NPT Stronger After Iraq", Bulletin of the Atomic Scientists, October, 1991, P. 13.

16. IAEA News brief, Vol. 6 No. 3 March/April 1991 P. 23.

17. INFCIRC/INF, Para. 28, Text in UNIDIR, P. 63.

The IAEA standing Advisory group on safeguards implementation has fixed significant quantity as 8 kilograms of plutonium or 25 kilograms of uranium enriched to 20 percent or more in uranium 235, or 8 kilograms of uranium 233.¹⁸ What is now suggested is that these limits should be lowered. It is suggested has even the period of 'timely detection' which a present is seven to ten days for plutonium or highly enriched uranium in metallic form and one to three months of plutonium in irradiated fuel and about one year for natural or low enriched uranium should be lowered, particularly in regard to direct use of nuclear material. The most fundamental requirement for successful inspection is information. Inspectors must know where to go and what to inspect. It is not possible for inspector to insist and examine every building and basement in a foreign country and random visits will not help very much.¹⁹

It now being proposed that the information provided by the inspected states will be supplemented by other data, e.g. from other states concerning the export and import of nuclear material and certain types of equipment. Had such data regarding Iraq been available to the IAEA and been analysed before the Gulf

18. IAEA/INF. 4. 1983 cited in Josef Goldblat, The Non-Proliferation treaty. How to Remove the Residual Threats (UNI-DIR) Research Paper No. 13, UN New York, 1992, P. 6.

19. Blix, Hans, 'The dual challenge of the nuclear age', special report, IAEA Bulletin, Vol. 35. No. 1, January, 1993, P. 35.

War, it is quite possible that special explanations and visits would have been requested by the Agency.²⁰

All data that may be made available to the IAEA including such that may originate in satellite surveillance or other sources, must of course be critically analysed and assessed. There is much erroneous information and disinformation in circulation. It is the Agency's professional duty not to base its actions and conclusions simply on entrust; it is also its duty to avoid voicing unnecessary suspicion and false alarms.

A right of unimpeded access for inspectors to relevant sites and material is of crucial importance when information is available, suggesting the need for such inspection. In the case of Iraq exceptionally for-reaching rights of access were obtained through security council Resolution 687 and a subsequent agreement. It is not likely that governments generally would accept such comprehensive right of access.²¹

While it is important to continue strengthening and facilitating the right of access for international inspections. One must be aware that the inspectors are not an international police that may be used, if need be, in some sort of commando raids. The inspectors go to the territory and installations which are controlled by national authorities and which are made available by those authorities for inspection. The precise nature of that

20. Ibid.

21. Ibid, P. 36.

night of access and effective international support for that right, therefore become crucial. An international inspectorate has no means of its own to force its way to a target of inspection.

The safeguards agreement would be violated not only by non-declaration of the production of enriched uranium or plutonium, but also by a denial of the right of access stipulated for inspectors.²²

Special Inspections:

The model NPT/IAEA Safeguard Agreement INFCIRC/153 authorises IAEA to conduct 'special Inspections' in addition to routine and ad hoc inspections. As per the paragraph 73 of this safeguard agreement the Agency may undertake 'special inspections' in order to verify the information contained in special reports. The Paragraphs 77 of this agreement provides that in case of launching of 'Special Inspections' as per Paragraph 73, the State and Agency should hold discussions forthwith. Till Iraq's issue came up the IAEA had never conducted inspections discussion locations or facilities other than those at which safeguard material or equipment was located. It is pointed out that it is not clear whether the term 'location' applies to part of declared plants or to undeclared plants.²³

In view of the eventualities like Iraq, a strong case is being made for the use of 'Special Inspection' and 'Challenge

22. Ibid.

23. Text of INFCIRC/153, para 18, 21.

Inspections. The Iraqi case, has amply shown that a state could mislead inspection teams with right that significantly exceed to those under the 'special Inspection' provisions of INFEIRC/153.²⁴

It is because of the weakness of the INFCIRC/153 provisions, relating to 'Special Inspections' that the Director-General-internal made a strong plea for more 'intrusive' safeguards systems but at a less cost.

Access to Informations from National Technical Means (NTM):

The Agency should have access to information obtained through national technical means (NTM) regarding sites that may require inspection. NTM being primarily satellite "Cameras and Detectors" as in the case of Iraq. It is suggested that a special unit in the Agency should receive information from member nations satellites. Through it may not spot everything, yet would enable inspectors to identify targets requiring visits."²⁵ It is also proposed that the IAEA could be given wider rights for unannounced inspections and a right of entry for inspectors without visa requirements." Moreover the right of access for inspection pur-

24. UNIDIR, The implications of IAEA Inspections under the Security Council Reso. 687 (Research Paper No. 1, UNIDIR, UN, New York, 1992, P. 24.

25. Blix Hans, "The A. Bomb Squad", World Monitor No. 18, November 1991, P. 57.

poses must be linked to an enforcement mechanism held by the Director General.²⁶

It is also suggested that Agency's annual safeguard budget should be increased as the present budget of \$ 60 million is absolutely insufficient with just 200 inspectors to cover 1000 installations world wide.

The public debate has pointed out that the method occasionally used in Iraq - unannounced 'snap' nuclear inspections as the central ingredient, should perhaps be used in the future to detect such clandestine designs. These surprise inspections with the support of U.N. security council did not give the Iraqi authorities time to cover or shift the interesting material.

Article IX of the chemical weapons convention provides that a state party will have the right to request a 'Challenge Inspections' of "any facility or locations in the territory of another party for the purpose of clarifying and resolving any question concerning possible non compliance." Dr. Blix has been making a strong case for the extension of the provisions of CWC in relation to the 'Special Inspection' by the IAEA, ignoring the fact that both are

26. IAEA Press Release Pr/91, 24 Vienna, 18 July 1991 Also "Blix Asks, New Safeguard Authority as IAEA says Iraq Violated Pledge." Nucleonics week, July 25, 1991, P. 117. Hans Blix "IAEA Safeguard; New Challenges", Disarmament, Vol. 15, No. 2, 1992. Hans Blix, "The A. Bomb Squad, "Christian Science Publishing Society, P. 1 First featured in World Monitor', November, 1991.

dissimilar in more than one ways and unless weapon states agree completely to destroy all their nuclear arsenals it would be unrealistic to talk of application of the CWC provisions, particularly relating to the 'Challenge Inspection' in relation to nuclear non-Protiferation regime.

Access to the UN security Council:

The most controversial and important point raised by the Director General was the access to the UN security council for the implementation of "Special Inspections" of suspected nuclear facilities of the NPT party with the mandate from the security council.

27 The access to the UN security council according to Director General would provide a legal basis for he "intrusive" measures.

If the 'intrusive' measures as suggested by the Director General are to be achieved, than either INFCIRC/153 has got to be renegotiated or additional safeguards agreement with NPT states have to be attached. Some commentators have suggested that an additional protocol to the NPT may be attached, for new obligations which may be mandatory all parties. The cavet, however, is whether the parties to The treaty would be prepared to negotiate such protocols to a treaty which is in a crucial stage. Its future in the present form itself is to be decided in 1995. Though the sup-

27. Donnell warren H., Davies Zachary S., International Atomic Energy Agency: Strengthen Verification Authority. Congressional Research Service Issue Brief Washington (CRS), September 17, 1991, P. 5.

porters of "intrusive" measures may like its extension with more "intrusive safeguards." Moreover, it is doubtful whether the countries both industrialised and the developing are likely to accept any increase in the power of international organization."²⁸

Thus the proposals of Dr. Hans Blix in a nutshell asked for an unlimited access to he suspect nuclear facilities of a signatory country, the intelligence agencies of the member states to provide information regarding the suspect countries nuclear activities through satellites and a full backing of the UN security council for taking appropriate action against the violations of the NPT safeguards as agreed by the NPT signatory.

Lastly, aggressive export monitoring with the cooperation of the business community, can be particularly useful in detecting secret activities. Scrutinies of exports has revealed centrifuge and weaponization activities that might otherwise have been difficult to detect weapons programmes in the developing world have depended on the import of equipment materials, or components. These countries' programmes are particularly vulnerable to disruption through export controls.²⁹

28. Albright, David. 'A Proliferation Primer' P. 23.

29. Ryukichi Imai served as Ambassador of Japan to Kuwait, to the conference on Disarmament in Geneva, and to Mexico. He is a member of the UN Advisory Board on Disarmament Matters and currently counsellor at the Atomic Energy Commission of Japan.

But export controls are not a panacea. A determined country with adequate resources can mount an effort to defeat or bypass export controls. Because technology is spreading worldwide, export monitoring may eventually become less effective.

ANALYSIS OF THE SAFEGUARDS REGIME

One of the IAEA's primary objectives is the promotion of nuclear energy for peaceful uses and the Article II of the IAEA statute clearly says this. However, the non-proliferation role is not explicit in the statutes of the IAEA. Still over the years, it has emerged as one of the foremost organizations in the pursuit of nuclear non-proliferation.

The elaborate non-proliferation regime with the Non-Proliferation Treaty (NPT) as its main pillar, consists of nuclear safeguards and an expanding web of technological controls. The early history of the nuclear age represents an over nuclear culture which accorded great significance to the visibility of nuclear weapons. The NPT was evolved when this was the predominant culture. It does not sit well in a milieu informed by overt nuclear culture.

The NPT safeguards, drafted to protect the commercial and proprietary interests of the industrialized states, apply to the flow of nuclear material measured by instruments located at strategic points in the fuel cycle. The IAEA is not authorized to search for clandestine facilities. The objective of NPT is finally detection of diversion of significant quantities of nuclear material from peaceful to military activities and its deterrence through risk of early detection. The safeguards system makes provisions for material unaccounted for (MUF) in a sophisticated nuclear

fuel cycle the amount of MUF would obviously be considerable. As a Japanese expert, Ryukichi Imai³⁰ has pointed out; "Put cynically the amount of material unaccounted for could total 10 to 15 bombs every six months. "These NPT safeguards were designed with major contributions from west germany and Japan; The two countries were afraid of industrial espionage through inspections and were emphatic about keeping human intervention to the barest minimum.³¹

The NPT allows non-explosive military research; nuclear propulsion which generally needs highly enriched uranium is permitted. This is not loophole in the treaty as some non-proliferation enthusiasts are now suggesting; this provision was deliberately inserted at the instance of he industrially advanced nations.³²

The IAEA which over the years has because a major instrument of non Protiferation and since 1974 has occupied a central place in the western sponsored nuclear non-Protiferation drive is sought to be used to further strengthen the regime at the cost of NNWS, as it becomes oblivious to their aspirations of peaceful use of nuclear energy, the purpose for which it was originally created.³³

30. Zuberi, M. 'Nuclear Arm Control', World Focus, May 1993 P.4.

31. Ibid.

32. Kapur, K.D., Foreign Affairs Reports, P. 20.

33. Brahma Challaney, "IAEA As Nuclear Policeman", Indian Express, 25 October 1991.

The IAEA is accused of having failed in its original objective to help member countries to exchange scientific and technical information and transfer of nuclear material for peaceful purposes. It has not succeeded in achieving its objective to promote civilian nuclear power in the NNWS of the Third World at a time when they are facing growing energy demands. Equally important is the fact that it is earmarking a sizable chunk of its budget for safeguards while it is not meeting the peaceful nuclear energy requirements of the developing countries. Its over-enthusiasm about nuclear non-proliferation, prompted by the industrialised world has frustrated the civilian nuclear power programs of the third world countries. Structurally also, like many other international institutions, its decision making mechanism is by and large dominated by thirteen industrially advanced countries who have permanent seats in the Board of Governors. As they have great influence on the decision making they have generally shown resistance to the Third World demands expressed in the IAEA General conference. The fears about its future role are also raised because the new proposals virtually amount to making IAEA work under UN security council, as the Director General is toying with the idea of creating a permanent UN commission on safeguards such a change would radically undermine the interests of the IAEA's non-nuclear weapon member states belonging to the Third World. The fears are that the Agency may be turned into a "Foreign Policy and Security Instrument of some powers through a safeguard system that will employ police like measures and glee-

fully encroach on the national sovereignty of states."³⁴

North Korea, extremely critical of its functioning held that: IAEA had no right to use military information given to it by a third party: it was acting in a partisan manner in favour of the nuclear weapon states; by asking inspection of the suspected sites it would be acting virtually as of the US; both IAEA and US practised double standard in pursuant of highly discriminatory and dubious nuclear non-proliferation; and the IAEA was simply being used by the US to advance its own political and security interest.

There is a strong opinion amongst the NNWS that there is no particular need to bring about radical changes in the existing safeguard system. What is needed, is to generate political will and political disincentives for nuclearization, not to think in terms of acquisition of nuclear weapons which could be done only by setting examples by the nuclear weapons states.³⁵

India has been critical of these proposals and has challenged attempts to vest additional powers in the IAEA to conduct unprecedented 'Special Inspection' in member countries to verify inventories of nuclear material for applying safeguards decided at the Agency's Board of Governors. At the Board of governors' meetings in September 1991 the Indian delegation cautioned the Agency against these changes as these powers were not envisaged

34. Ibid.

35. National Herald, 16 September, 1991.

by the statutes of the IAEA. The Indian delegation suggested that the Agency should reassess its role and find a 'balance' between its promotional and regulatory role' before jumping in to grab yet another role of policing. The Indian representative also disagreed on the nuclear inventories of South Africa and forced a vote on it. Some more members concurred with India, on this issue.³⁶ During Dr. Hans Blix's visit to India in November 1991, India criticised IAEA for shuffling of its role.³⁷

However, effective participation and lobbying by countries opposed to such 'intrusive' measure made the Board of governors to turn down the proposals. Through the IAEA for the time being been prevented from amending its statute, the very fact that the secretariat had done a thorough exercise on this issue, and its role in collusion with the U.S. in destroying the Iraqi nuclear installations after seeking a mandate from the UN Security Council does not augur well for future. Some statutes would be too enthusiastic to resort to such intrusive measures. There is a need for sustained resistance to such grabbing of powers of the Agency.

Resolution 687 is likely to set a precedent for future IAEA/UNSC punitive action against violations of the IAEA safeguards, even

36. Times of India, 23 November 1991.

37. UNIDIR, The Implications of IAEA Inspections under Security Council Resolution 687 (Research Paper No. 1 UNIDIR, UN New York, 1992), P. 33.

at the cost of the violations of their sovereignty. Restriction of Iraq's nuclear equipment and material in pursuance of the UN security council Resolution 687 wherein the security council used the experience of an intergovernmental organizations specializing in nuclear energy and deviated in a major way from the role assigned to the IAEA as per its statutes and IAEA/NPT model safeguard Agreement INFCIRC/153 and conducted an intensive on site inspection in the course of which the Agency was forced to make significant adjustments like "elaborated new definitions, developed new inspection methods, and made unprecedented use of information obtained through national technical means of freely available information."³⁸

The obligations contained in the UNSC Resolution 687 to remove the material implies the mistrust of the international community in its ability to control these materials effectively. The UNSC Resolution 707 underlines this mistrust in the IAEA safeguards, as this Resolution absolutely prohibits any significant nuclear activities in Iraq.

Interestingly, the Resolution does not provide for IAEA control over nuclear weapons that might be discovered in Iraq. This leads to the conclusion that the security Council either did not expect assembled nuclear weapons to be found in Iraq or the drafters of the Resolution wanted to reserve the right to take the

38. Pande, Savita, IAEA Inspections in "Iraq Case for Safeguards Reforms? Strategic Analysis, August 1993, P. 565.

weapons into custody themselves. Either way, it constitutes an inconsistency.³⁹ Regarding reforms induced by UN Resolution 687, doubts have been expressed about the effectiveness of tightening the safeguards system by making use of the existing safeguards system. This has been based on the arguments that strict application of special inspections seems not to be a promising approach.⁴⁰

The techniques applied during Iraq's Inspection were based on the IAEA safeguard experience even in a limited way and the "assessment of the production capacities went beyond these experience", but inspectors did not succeed in developing adequate measures because of their knowledge in the area of nuclear energy. Unlike its earlier practice, the Agency also do not make use of the information provided by the inspected state. The information was not collected independently by IAEA team, but was provided by the UNSCOM. Which used data received from government's along with the data collected by UNSCOM/IAEA teams from their observations during their visits to Iraq.⁴¹

Equally important and unusual was the task of the Agency when it assessed, whether the facilities were part of the nuclear weapon

39. Eric Chuvistre, "Implication of IAEA inspection under security Council reso. 687 (UNIDIR, New York) & P. 24.

40. UNIDIR, The Implications of IAEA Inspection under Security Council Reso. 687 (Research Paper No. 1 UNIDIR, New York 1992), P. 33.

41. Ibid, P. 34.

programme, or not. All that the Agency's objectives require is that the safeguards materials are not diverted to military purposes. Both the IAEA statute and NPT safeguard do not allow the Agency to pass judgment whether a programme is meaningful or not. To comment whether a nuclear plant worked efficiently was completely new to the IAEA inspection activities. If this role of IAEA was accepted it would raise many questions about the "objectives of the nuclear programme of several states, if used under IAEA safeguard activities."⁴²

As discussed, the proposals made by the Director General to improve IAEA safeguard Regime if accepted any time, would require significant 'legal changes' and entirely a new attitude towards inspection. And as the attitude of the IAEA members from the Developing Countries show they do not seem to be in a mood to oblige the nuclear weapon states and other industrial countries till a non-discriminatory nuclear non-proliferation regime is built by them. The NNWS parties to the treaty would be willing to accept 'challenge inspections' and the 'intrusive measures' suggested by the IAEA Director-General provided the nuclear non-proliferation regime because non-discriminatory on the pattern of chemical weapons convention. Strengthening of IAEA safeguards and verification system is no substitute for affective global Disarmament and particularly the acceptance of Comprehensive Test Ban Treaty by the nuclear weapon states. The Developing countries

42. Ibid, P. 35.

are no likely to accept any 'intrusive' inspection measures leading to further erosion of their sovereign rights and exposing themselves to politically motivated interventionist 'Special Inspection. Any break through on Hans Blix proposals would be incumbent on the overall development in the Nuclear Disarmament and arms control by the Nuclear weapons states.

There are little chances that the experience in other areas of verification like chemical weapons convention would help in evolving more effective controls in the nuclear weapons verification. It is to assume the more challenging role of verification the Agency would have to be spirit, since its primary role as identified in the statute is to provide nuclear energy. Its more involvement in verification would possibly be in contradiction with its statutory obligation of promoting nuclear energy. The safeguard function of the IAEA could be associated with a technical secretariat which may be created as in being done in the case of chemical weapons convention, the growing number of delegates to the IAEA Board of Governors and the General conference and the secretariat itself would be able to show more concern with non-proliferation rather than the promotion of nuclear energy.

However, the present situation seems to be that most states are not in favour of strong controls and more intrusive safe-guards because of the mistrust in the international organization though it is argued that more 'intensive controls' would be advantageous to almost all the states. States, which see spread of nuclear weapons as threat to their security have a stake in the preven-

tions of nuclear weapons. The Third World countries who fear civils on high Tech. exports are interested in a safeguard system that should encourage the potential supplier of advanced technology.⁴³ They are about likely to support as their payoffs are much less than what they would be loosing in terms of making their countries more vulnerable and exposed to already strong foreign intervention leading to further compromises on their sovereign national rights.

Many members of the IAEA are keen to freere the IAEA budget, this seems to be astonishing as the IAEA safeguard budget is just negligible as compared to the world's military expenditure. thus reluctance to pay for appropriate price for verification measures would simply enhance the cost efficiency rather than the effectiveness of the safeguard system. What is needed is the maintenance of the present measures along with enforcing of the controls. More "intrusive inspections" should not replace currently applied measures. Reluctance on the part of some industrial states towards more 'intrusive control' probably may be because of the fear that "to apply same standards as those applied in Iraq would reveal a lack of accuracy in the handling of nuclear weapon usable material in countries with a significant nuclear industry."⁴⁴ To the supporters, the achievement of a credible control system would invariably involve some 'sacrifice of national sovereignty and national security in the future. It

43. Ibid.

44. Ibid, P. 36.

is suggested by the protagonists that probably more intrusive verification, on the lines of the UNSC Resolution 687 may be possible if inspections are carried out by the international civil servant and without the use of military force.

Interestingly, the North Korea case simply confirmed Dr. Hans Blix resolve to use the information gathered through doubtful means in support of "intrusive inspection" to be carried out by the IAEA under direction of the UN security Council, even at the cost of undermining the national sovereignty in contradiction to the declared objective of the IAEA.

There are three relevant elements for successful implementation of a regime such as that of non-proliferation: expectation authority and resources. When authority and resource are in synchronous relation with expectations, the system can work; if they are not, problems arise. Public expectation tended to exceed the authority and certainly the resources made available to IAEA for earning out its safeguards responsibilities when it came to the question of clandestine nuclear activity and the preventing of nuclear proliferation.⁴⁵

It is a political call for the states in the new world order to decide whether or not they want, and are prepared, to pay the political, financial and related costs of a credible safeguards system. Such a system must go further than the present one in mapping, publicizing and verifying the nuclear activities of

45. Scheinman, Lawrence, 'Safeguards; New Threats and New Expectations,' Strategic Digest, September, 1992, P. 118.

participating states, a system in which they can place sufficient trust and confidence to allow it to serve as a basis for planning their own security policies.

Today's system meets some, but not all, of these requirements. Whether this can be fully achieved is open to question for it involves many parameters. What is certain is that the worst possible outcome would be to allow expectations to reach beyond the authority and resources the international community is prepared to give.

APPENDIX I



LIST OF ABBREVIATIONS

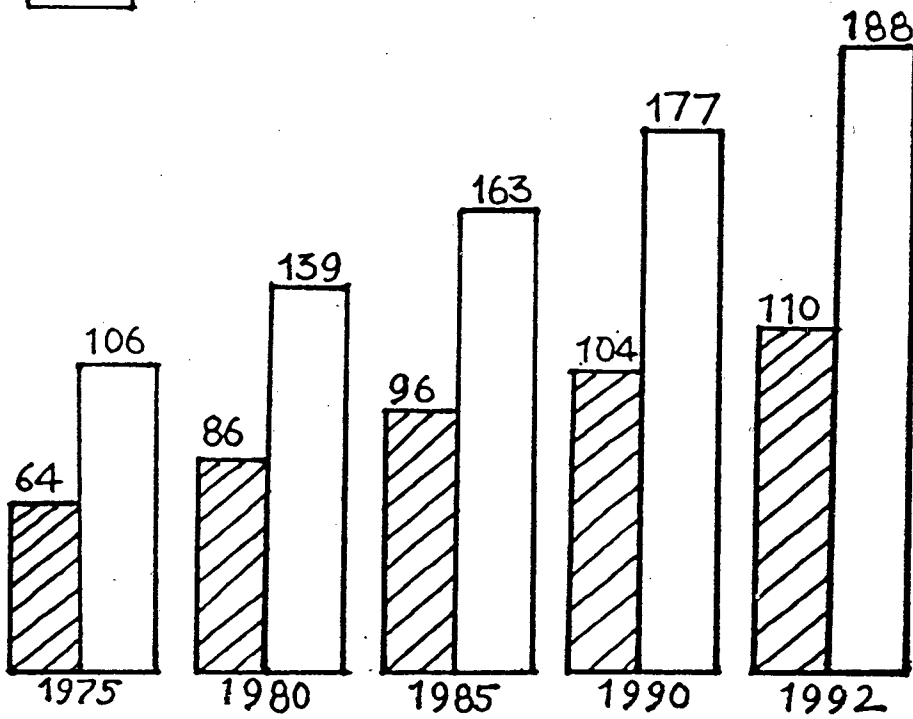
ADM	Administration.
ARIE	Actual Routine Inspection Effort.
CANDU	Canadian - Deuterium - Uranium
CCTV	Closed Circuit Television System.
CNNWS	Conference of Non Nuclear Weapon States.
C/S	Containment and Surveillance
CTBT	Comprehensive Test Ban Treaty
EAOCO	Executive Agency Overhead Cost.
ECOSOC	Economic and Social Council.
EPTA	Expanded Programme for Technical Assistance
EURATOM	European Atomic Energy Community
GC	General Conference
GEN/PUB	General / Publication
GOV	Government
HEU	Highly Enriched Uranium
IAEA	International Atomic Energy Agency
ICTA	Interdepartmental Committee on Technical Assist-
ance	
INF	Information
INFCIRC	Information Circular
MBA	Material Balance Area
MUF	Material Unaccounted For.
NDA	Non-Destructive Assay (Technique)
NPT	Non-Proliferation Treaty
NRTA	Near Real Time Accuracy
NTM	National Technical Means.

PAM Preliminary Assistance Programme.
RECOVER Remote Continuous Verification System.
RES/RESO Resolution
SAL Safeguards Analytical Laboratory
SF Special Fund
SG Safeguards
SIDA Swedish International Development Authority
SIPRI Stockholm International Peace Research Institute.
SIR Safeguards Inspection Report.
SQ Significant Quantity
TA Technical Assistance
TAC Technical Assistance Committee
TAP Technical Assistance Programme
UN United Nations
UNDP United Nations Development Programme
UNGA United Nations General Assembly
UNIDIR United Nations Institute for Disarmament Research.
UNSCOM United Nations Special Committee

APPENDIX II

SAFEGUARDS STATISTICS

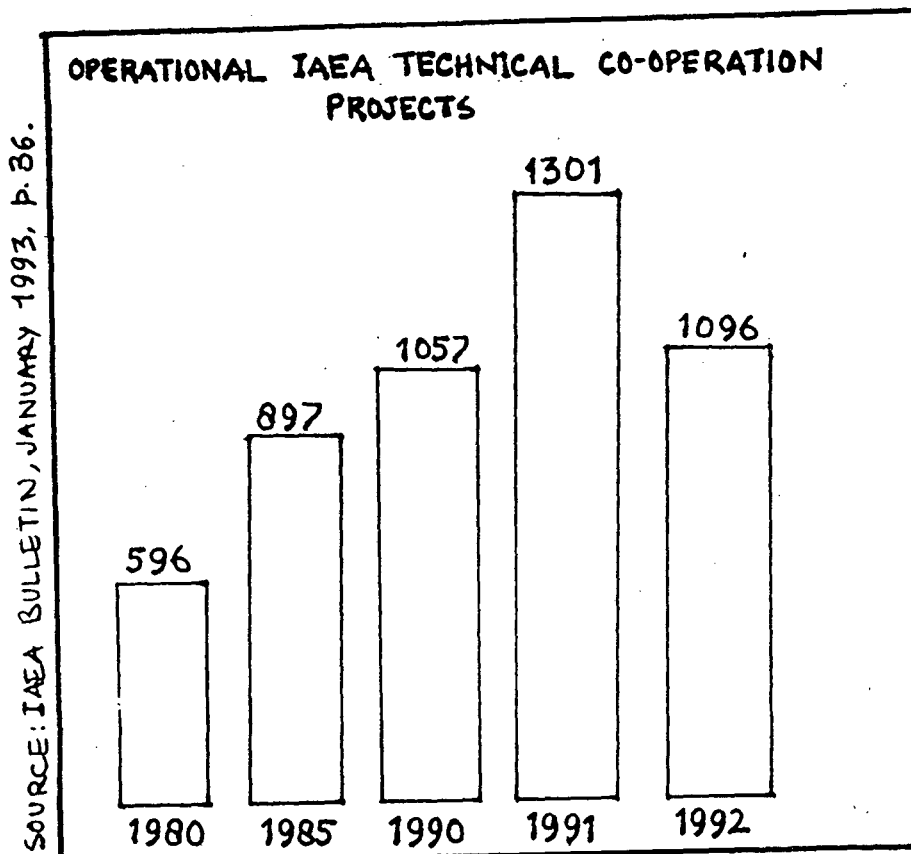
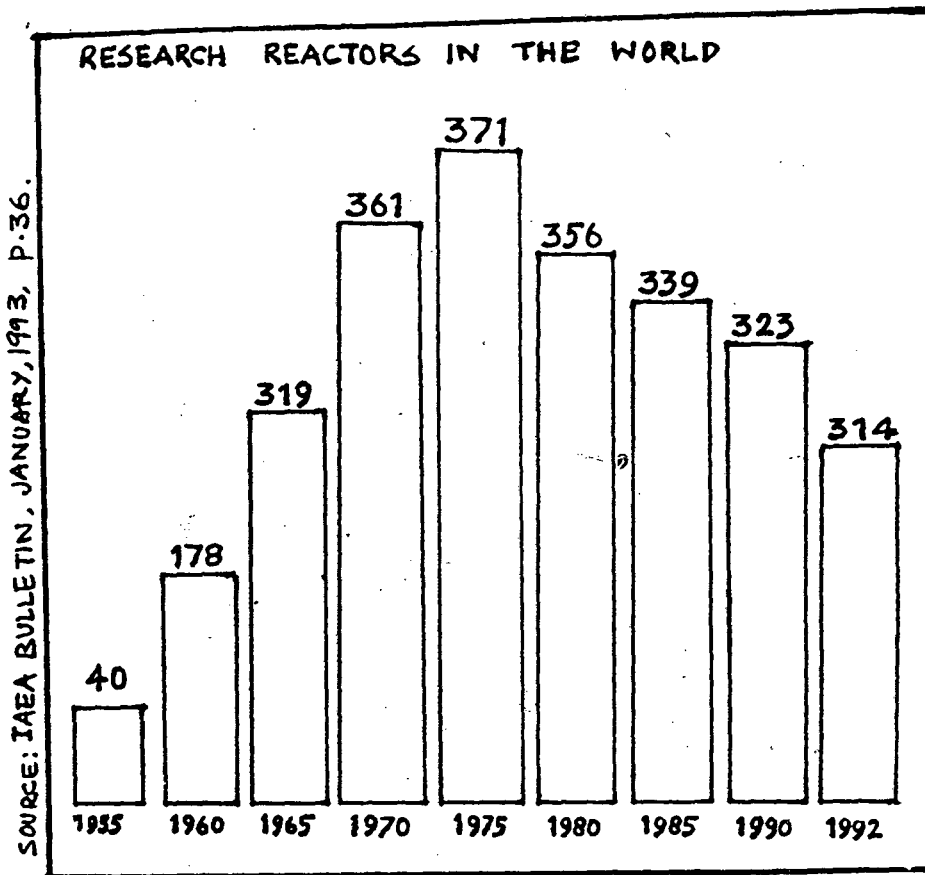
 States with safeguards agreement in force.
 Safeguards agreement in force.



SOURCE: IAEA BULLETIN, JANUARY 1993, P. 37.

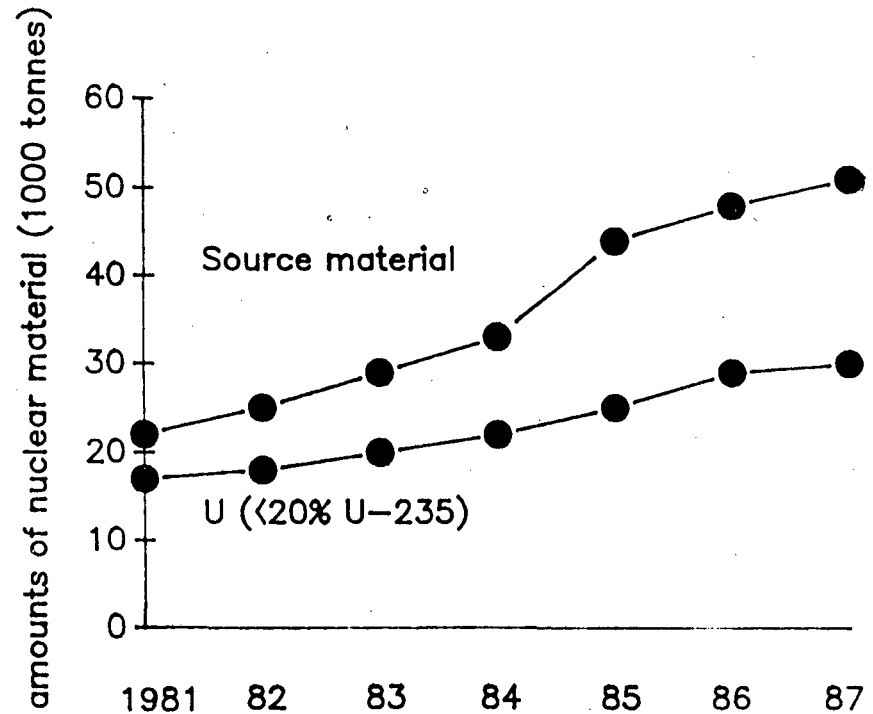
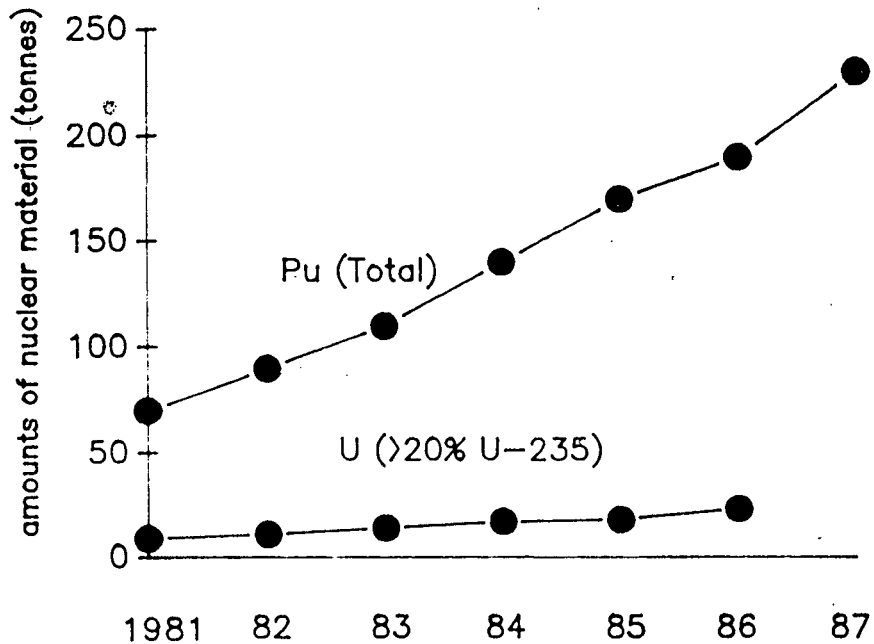
Note: Not all states have nuclear activities

APPENDIX III



APPENDIX IV

AMOUNTS OF NUCLEAR MATERIALS UNDER IAEA SAFEGUARDS*



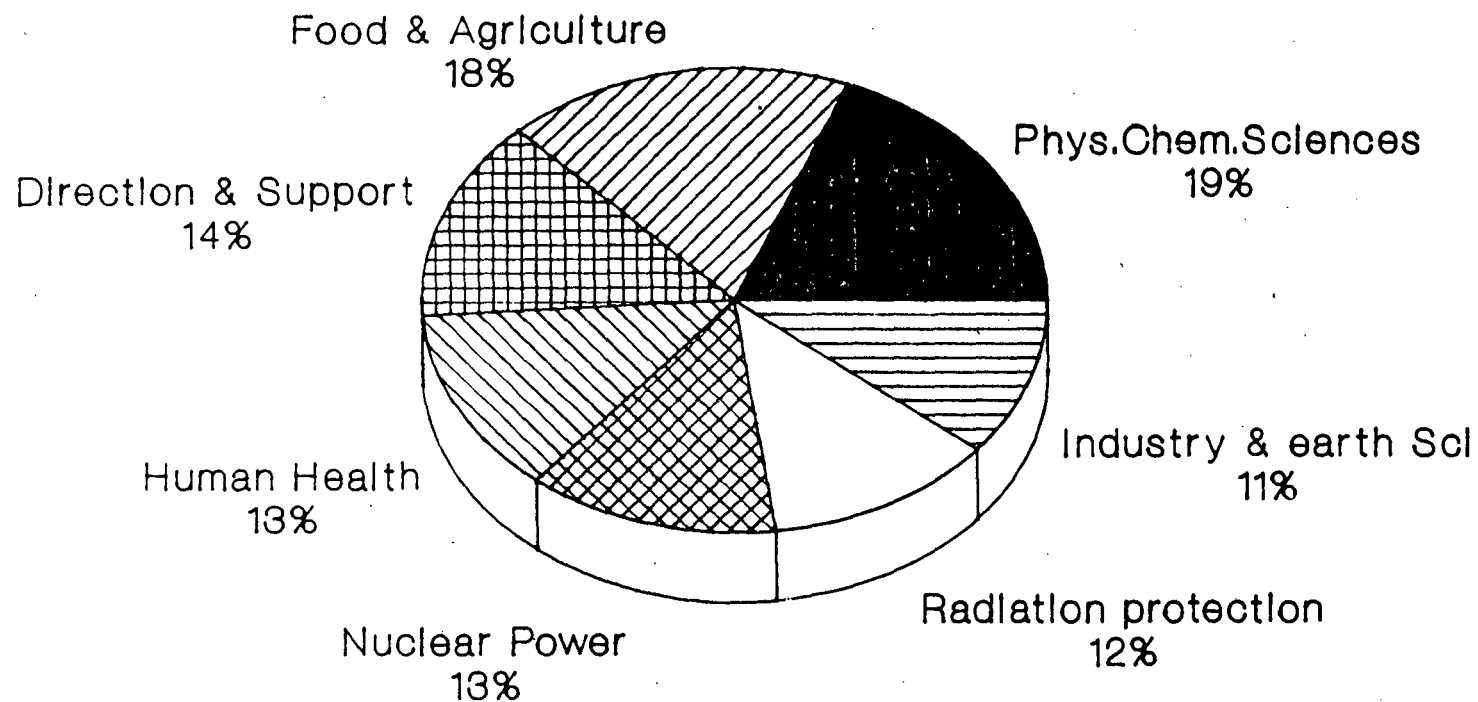
* Including all safeguarded nuclear material in nuclear-weapon states.

Note: Data for plutonium refer to the total amount of plutonium, i.e., that contained in irradiated fuel and separated plutonium.

SOURCE: V. Schuricht and L. Larrimore, "Safeguarded Nuclear Fuel Cycle Facilities," IAEA Bulletin, Vol. 30, No. 1, 1988, p. 9.

APPENDIX V

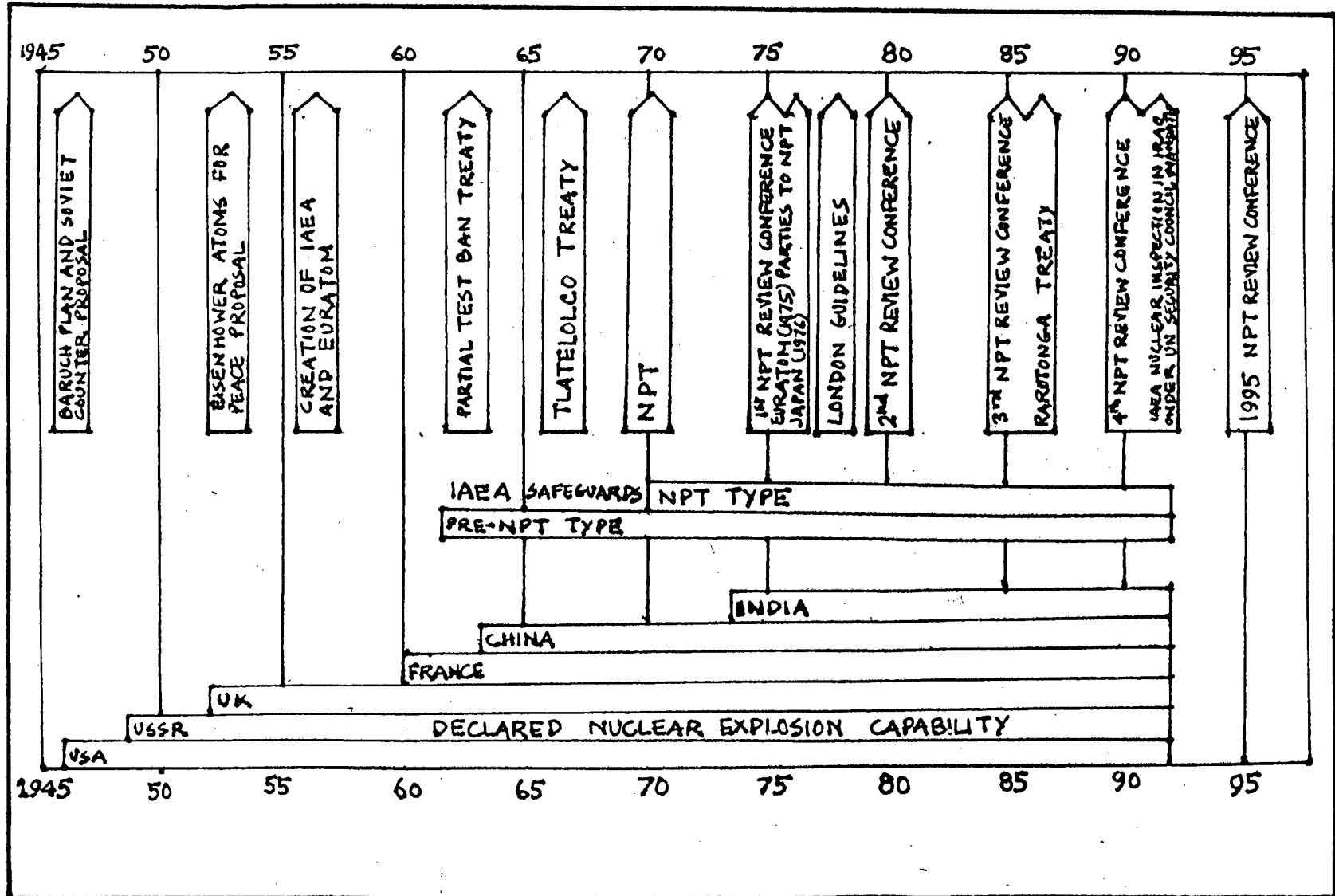
IAEA, 1993-94 Technical co-operation programme.



SOURCE: IAEA BULLETIN, JANUARY, 1993, P. 43.

APPENDIX VI

MAJOR ELEMENTS OF THE INTERNATIONAL NUCLEAR NON-PROLIFERATION REGIME



SOURCE: IAEA BULLETIN, JANUARY, 1993, p37.

APPENDIX VII

1957	Viet Nam	1966
Afghanistan	Yugoslavia	Jordan
Albania		Panama
Argentina	1958	1967
Australia	Belgium	Sierra Leone
Austria	Cambodia	Singapore
Belarus	Ecuador	Uganda
Brazil	Finland	
Bulgaria	Iran, Islamic Republic of	1968
Canada	Luxembourg	Liechtenstein
Cuba	Mexico	
Denmark	Philippines	1969
Dominican Republic	Sudan	Malaysia
Egypt		Niger
El Salvador	1959	Zambia
Ethiopia	Iraq	
France		1970
Germany	1960	Ireland
Greece	Chile	
Guatemala	Colombia	1972
Haiti	Ghana	Bangladesh
Holy See	Senegal	
Hungary		1973
Iceland	1961	Kenya
India	Lebanon	
Indonesia	Mali	1974
Iran	Zambia	Democratic Republic of Congo
Italy		Mauritius
Japan	1962	
Korea, Republic of	Liberia	1975
Monaco	Saudi Arabia	Qatar
Morocco		United Arab Emirates
Myanmar	1963	United Republic of Tanzania
Netherlands	Algeria	
New Zealand		1977
Norway		Nicaragua
Paraguay		
Peru		1983
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