Chapter IV

NON-PROLIFERATION REGIME AND THE RESPONSE
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The limited nuclear power development in the Third World has caused an unlimited concern in the industrialised countries about nuclear weapons proliferation. The nuclear technology export policies of advanced nations have been various responses to the problem of establishing a "nuclear divide" between nuclear technology for energy generation and manufacture of nuclear weapons. Besides the toughening of the conditions under which civil nuclear technology is exported by nuclear supplier countries, there has been an international "regime" of nuclear non-proliferation grappling with the above central problem. The "regime" has also responded to the growing concern of nuclear non-proliferation, and has been in a constant flux throughout the 1970s.

THE CONCEPT OF REGIME

In the study of international relations, particularly in the study of the complex interdependence among nations, and in the study of emerging issue-related areas such as food, trade, energy, world monetary system, technology, law of the sea, etc., the concept of regime is seen increasingly as an

useful analytical tool. Keohane and Nye defined regimes as follows: "By creating or accepting procedures, rules, or institutions for certain kinds of activity, governments regulate and control transnational and inter-state relations. We refer to these governing arrangements as international regimes".

Young defines a regime as any international agreement which focuses and structures convergent expectations, rights and obligations of international actors with respect to a substantive matter. According to Haas, "regimes are norms, rules, and procedures agreed to in order to regulate an issue-area". Haas is in broad agreement with Young's conceptualisation, but seeks to narrow his purpose by reserving the concept for the particular kind of agreement that features "issue-linkage". Haas also agrees with Young's restriction stressing agreement instead of following the practice of equating "regime" with the more diffuse notion of "world order".


3 Keohane and Nye, n. 2, p. 5.


Without entering into the debate about the merits, demerits and the nuances involved in the definitions, the nuclear non-proliferation regime is seen here as encompassing those international mechanisms which deal with the "nuclear divide" between nuclear weapons and nuclear reactors. In this regime the components are seen to be the Non-Proliferation Treaty (NPT), the International Atomic Energy Agency (IAEA), the London Club, the International Nuclear Fuel Cycle Evaluation (INFCCE) and attempts at internationalisation of the fuel cycle. The above components are of a varied nature -- the NPT is a treaty, the IAEA an international organization, the London Club an informal club of nuclear suppliers the INFCCE an exercise in evaluating of the nuclear fuel cycle, and internationalisation is as yet a concept. The nature of this regime, the developing nations' response to it and their plausible role in altering the dynamics of the regime will be analysed, in this chapter.

**TREATY ON THE NON-PROLIFERATION OF NUCLEAR WEAPONS (NPT)**

The existing literature on NPT is abundant and extensive. The first proposals dealing directly with the spread of nuclear weapons were advanced by the Soviet Union and United States in the UN Disarmament Commission in 1956-57. The negotiation of such a treaty, however, began only in 1965, following the Chinese nuclear explosion in October 1964, and the vote of the UN Disarmament Commission in June 1965 by which the Eighteen Nation Disarmament Committee (ENDC) was requested to consider
the question of a treaty or a convention on non-proliferation of nuclear weapons. The VNDC after three years of negotiations at Geneva, transmitted a comprehensive report to the United Nations, which examined the matter during a special session of the General Assembly. This session ended on June 12, 1968. It adopted a skilfully worded resolution supported by a hundred countries. Twenty nations (including Argentina, Brazil, France, India and Spain) abstained. The Treaty on the Non-Proliferation of Nuclear Weapons saw the light of the day on July 1, 1968, when it was signed by the three depositary states, the USA, UK and USSR. It was then open for signatures by the countries of the world. The NPT entered into force on March 5, 1970. By February 1981, 113 nations became parties to the Treaty.

The NPT aimed at fixing once and for all the number of nuclear weapon powers. It defined the nuclear weapon power as a state which manufactured and exploded a nuclear weapon or any other nuclear explosive device before January 1, 1967, and therefore covered the five nuclear weapon powers. The Treaty prohibits the nuclear weapon powers from transferring nuclear weapons or other nuclear explosive devices or control over them to any nation whatsoever. It also prohibits the nuclear weapon states from helping any non-nuclear weapon state to manufacture or acquire such weapons or devices, or to have


control over them (Article I). Conversely, the non-nuclear weapon states party to the Treaty undertake not to accept the transfer of or control over such weapons or devices from any nation and not to manufacture them (Article II).

The NPT not only refers to nuclear weapons without defining them, but also to any other nuclear explosive device. The renunciation of nuclear weapons covers all systems intended for a peaceful nuclear explosion. "For the first time one of the peaceful uses of nuclear fission had been prohibited for the vast majority of states". In the face of vigorous opposition from the non-nuclear weapon powers such as India and Brazil to the necessity of renouncing the right to peaceful nuclear explosives, the United States and the Soviet Union were compelled to incorporate into the Treaty an article promising the non-nuclear weapon powers, at a minimal cost and on a non-discriminatory basis, a share of the benefits to be gained from peaceful nuclear explosions (Article V).

The non-nuclear weapon states party to the Treaty undertake to accept IAEA safeguards on their nuclear programmes for the sole purpose of verifying that nuclear energy has not been diverted from peaceful uses to nuclear weapons or other explosive devices. These safeguards apply to all nuclear materials and activities in their territory or elsewhere under their control. Furthermore, all states party to the Treaty undertake not to provide nuclear materials and equipment

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specially designed for the processing, utilisation or production of uranium - 235 and plutonium to any non-nuclear weapon state whatsoever (whether party to the Treaty or not), unless such materials and equipment are subject to the IAEA safeguards (Article III). In return, the NPT affirms that all states party to the Treaty, have the "inalienable right" to undertake research, production and exploitation of nuclear energy for peaceful purposes "without discrimination". The Treaty further enjoins all states, in a position to do so, to assist other countries in the development of nuclear technology for peaceful purposes, with due consideration to the needs of the "developing areas of the world" (Article IV). The nuclear weapon states also undertake to continue negotiating in good faith to find effective measures for ending the nuclear arms race and achieving nuclear disarmament (Article VI).

In the negotiation of the NPT, a number of conflicting interests had to be resolved. The United States and the Soviet Union, as an integral part of their de-escalation of mutual tensions and as a logical step after the Partial Test Ban Treaty (PTBT), were keenly interested in the conclusion


of the NPT. They managed to narrow down their differences and vigorously championed the NPT. The conclusion and implementation of the NPT was a major success for both the countries. The two superpowers "had brought off a tour de force and had succeeded, if not in imposing this 'nuclear Yalta', then at least in getting it accepted, by conjuring up the spectre of the threat to world peace if countries not possessing nuclear weapons were to acquire them".

Among the lesser nuclear weapon powers, the UK actively supported the Treaty. France and China, however, did not join them. France was not interested in any extension of the nuclear club. It criticised the PTBT as discriminatory, and stated that the proposed treaty (NPT) did not relate to disarmament, but was only an agreement on the non-arms of unarmed countries. It could neither join in the negotiation nor accede to an eventual non-proliferation treaty of the same discriminatory nature, even though the agreement did not in any way hamper its activities and sanctioned its status as a nuclear power. France, however, promised to behave like a party to the NPT. The Chinese attacked the NPT as a camouflage for the nuclear arms expansion of the United States

11 Goldschmidt, n. 8, p. 80.
12 Ibid., p. 74.
and Soviet Union in the name of nuclear disarmament.

The other socialist countries acceded to the Treaty. The industrialised nations of the West were apprehensive of being handicapped in world nuclear competition *vis-a-vis* the nuclear weapon powers which had completely retained their freedom of action and were likely to benefit from the impact of military operations on the civil domain. They also suspected that international safeguards might possibly be a source of industrial espionage, and demanded that the civil installations of nuclear weapon states should also be inspected. In response, the UK and US agreed to voluntarily submit their peaceful facilities for inspection by IAEA. The Soviet Union refused. The gesture by the UK and US was of dubious value since they were still the sole judges of which installations would be exempt from safeguards on grounds of national security. However, the EURATOM countries wrested a concession on safeguards. EURATOM safeguards were recognised as equivalent to the national monitoring systems of other countries, through the verification of which the IAEA safeguards system operates. The industrialised countries of the West, Germany in particular accepted the NPT on the specific interpretation that they would have complete freedom in the civil nuclear programmes. It meant that all stages of the nuclear fuel cycle can be developed -- including enrichment

and reprocessing -- so long as weapons are not manufactured. This interpretation was not seen as objectionable then.

Most of the Third World countries which joined the NPT, were extremely weak in the then prevailing international system and were vulnerable to pressure. The large number of accessions from the Third World were due to a tacit alliance between the nuclear weapon powers and those non-nuclear powers which had no hope of going nuclear in the foreseeable future. These less advanced countries of the Third World hoped that, in exchange for their renunciation, the nuclear powers would adopt specific measures of nuclear disarmament, never threaten to use, or use, nuclear devices against them, and would provide them with genuine assistance for the advancement in the peaceful application of nuclear energy.

Some of the advanced developing nations such as India, Brazil and Argentina opposed the NPT on various grounds. India gave the best articulation of the opposition to the treaty. The Indian representative at the UN in May 1968 offered a comprehensive critique of the proposed treaty:

(i) The treaty did not ensure the non-proliferation of nuclear weapons but only halted the spread of the weapons to non-nuclear weapon states (horizontal proliferation) without imposing any restrictions on the continued manufacture, stockpiling and sophistication of nuclear weapons by the nuclear

weapon powers (vertical proliferation). (ii) The treaty did not do away with the special status and prestige conferred on states in possession of nuclear weapons. (iii) It did not provide for a balance of obligations and responsibilities between the nuclear weapon powers and non-nuclear countries. (iv) The treaty did not constitute a step-by-step approach towards nuclear disarmament. (v) The treaty did not prohibit one nuclear weapon state from assisting another nuclear weapon state in the manufacture of nuclear weapons. (vi) Article VI did not create a juridical obligation regarding the cessation of nuclear arms race at an early date. (vii) The NPT imparted a false sense of security to the world. (viii) It was discriminatory in regard to the peaceful benefits of nuclear explosions. (ix) The treaty was also discriminatory in regard to safeguards and controls which were all imposed on non-nuclear weapon states while none whatsoever were imposed on the nuclear weapon states. (x) The security assurances to the non-nuclear weapon states could not be a quid pro quo for the acceptance of the treaty. This must be obligatory for the nuclear weapon states.

Argentina and Brazil echoed the same sentiments. Brazil repeatedly pointed out that while it supported the arms control purpose of the NPT, it strongly opposed

restrictions on the peaceful uses of nuclear technology. Brazil also considered the Treaty as incompatible with the interests of her economic development and her national security, and refused to accept the restrictions NPT imposed on peaceful uses of nuclear technology by non-nuclear weapon states. The main objection of Argentina to the NPT was that it may hamper the full utilisation of peaceful nuclear technology for its economic development. Argentina was anxious to defend the principle of national independence in all matters of nuclear technological development for peaceful purposes, and that it cannot consent to being reduced to a position of constant dependence in the field of nuclear technology, having already laid the groundwork for the necessary nuclear techniques to assist its economic development. An indication of Argentina's concern about the impact of NPT on economic development was its proposal that a widening technological gap should be included as a possible cause for withdrawal from the NPT.

The NPT has been castigated as "worse than an unequal treaty of the colonial type ever concluded" and as representing "a bizarre world of a new nuclear aristocracy to rule the non-nuclear serfdom". A few Western scholars have also criticised the NPT as discriminatory, too limited


19 Ibid., p. 51.

in scope and unlikely to curb proliferation of nuclear weapons. Kaplan argued that the criteria for a successful non-proliferation treaty should include a comprehensive test ban and significant progress in the control of vertical nuclear proliferation. Calling the NPT unequal and discriminatory, Alva Myrdal pointed out that the plan to have the non-nuclear powers accept responsibility for preventing the destruction of mankind by renouncing nuclear arms "amounted to a clever design to get NPT to function as a seal on the superpowers' hegemonic world policy". Looking back at the complicated and protracted negotiations of the NPT, Epstein wonders: "it seems almost a miracle that the NPT, with its evident shortcomings and with the many and serious reservations about it held by the non-nuclear powers, was approved by the overwhelming majority of the United Nations". Epstein is doubtful whether the Treaty if proposed now could receive the same support. The disillusionment of the non-nuclear powers with the failure of the superpowers to live up to their commitment has eroded a great deal the original support for the Treaty.

**Implementation of the NPT**

A decade of existence of the NPT confirmed the fears

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of the more advanced among the Third World who opposed it and disillusioned those of the Third World who believed in it. A number of developing countries which joined the NPT fondly hoped that they would be assisted in developing nuclear energy for peaceful purposes. The Article IV of NPT was to be a firm pledge by the nuclear weapon powers and other advanced nations to aid the peaceful nuclear development of the non-nuclear weapon countries, particularly the developing ones, in return for renouncing nuclear weapons. The emergence of the London Club restricting the transfers of nuclear technology, the unilateral policies of the US and Canada with regard to nuclear energy and nuclear proliferation rendered Article IV meaningless. Article IV remained as "a pious vow having no practical application, which tries to present in more palatable terms", a discriminatory treaty.

Similarly Article V which promised to share the benefits of peaceful nuclear explosions with non-nuclear countries, remains a dead letter. After the Indian nuclear explosion of May 1974, the nuclear powers have ceased all public discussion of peaceful nuclear explosions. Thus even the two limited sops offered to the non-nuclear powers under Articles IV and V have been reneged by the nuclear weapon powers.

Article VI relating to nuclear disarmament has been followed more in breach than in observance. The awesome

24 B. Goldschmidt, "International Nuclear Collaboration and Article IV of the Non-Proliferation Treaty", in Jasani, n. 17, p. 205.
nuclear arms race continues unabated and is reaching greater heights. Even as the nuclear weapon powers create fears of nuclear weapons being acquired by Third World states, they continue to legitimise the use of nuclear terror as a viable instrument of international policy.

The inherent discrimination in Article III, which imposed safeguards on all nuclear activities of the non-nuclear countries while leaving the nuclear sectors -- civil and military -- of the nuclear weapon powers, was further exacerbated in the implementation of NPT. The IAEA found no diversion from the safeguards facilities of non-nuclear countries. However, sufficient evidence exists to show that US civilian and military nuclear installations have been treating hundreds of kilograms of weapons grade fissile material as material unaccounted for (MUF). And it has been convincingly argued that part of this MUF could have


been instrumental in building up the clandestine nuclear
arsenal of Israel. This result of the surveillance of the
unarmed and non-surveillance of the armed exposes the dubious
nature of NPT.

Compounding the above is the existence of a nuclear
grey market and a black market for nuclear materials and
services in the Western countries. This is further confounded
by the NPT not explicitly prohibiting a non-nuclear weapon
state from assisting another non-nuclear state in acquiring
nuclear weapons. These weaknesses have been thoroughly
exposed in South Africa acquiring a clandestine nuclear
weapons, with Western connivance. Pakistan, too, has
followed this route in attempting to put together a centrifuge
enrichment plant. The fact that all the three states which
gained from this -- Israel, South Africa and Pakistan -- are

28 Christopher S. Raj, "Israel and Nuclear Weapons: A Case
of Clandestine Proliferation", IDSA Journal (New Delhi),
vol. 13, no. 1, July-September 1980, pp. 64-68.

29 Lewis Dunn, "Nuclear Gray Marketeering", International

30 For the existence of a nuclear blackmarket see
Office of Technology Assessment, US Congress,
Nuclear Proliferation and Safeguards (New York,
1977), pp. 36-37; see also International Herald

31 Zdnek Cervanka and Barbara Rogers, The Nuclear Axis
(London, 1978); C. Raja Mohan, "Atomic Teeth to
Apartheid: South Africa and Nuclear Weapons", IDSA
Journal, vol. 12, no. 3, January-March 1980,
pp. 254-69.

32 P.K.S. Namboodiri, "Pakistan's Nuclear Posture",
in K. Subrahmanyam, ed., Nuclear Myths and
Realities; India's Dilemma (New Delhi, 1981),
pp. 139-94.
lynchpins in Western alliance system lends credence to the theory that the West is encouraging selective nuclear proliferation among its allies.

In a profound analysis, Subrahmanyan propounded the new concept of "crypto nuclear weapon powers". Article I of NPT proscribes the assistance by nuclear weapon states to non-nuclear weapon states in manufacturing or acquiring "control" over nuclear weapons. According to NPT there are only five nuclear weapon powers. But there exist a number of countries, (for example the non-nuclear NATO countries) which station nuclear weapons on their soil, rely on nuclear war doctrines as their basic security strategy, have arrangements to take over the nuclear weapons at the initiation of a war, train their troops in the use of nuclear weapons and take part in strategic planning in respect of deployment of nuclear weapons and their targeting in war, and yet call themselves "non-nuclear". The non-nuclear NATO countries, although not having legal title to nuclear weapons on their soil, are for all practical purposes nuclear weapon powers, or "crypto nuclear weapon powers". Basing himself on the arguments of Lord Zuckerman, and in the light of the increasing

33 Swadesh Rana, "Towards Selective Proliferation: President Carter's Nuclear Non-Proliferation Policy and the Developing Countries", IDSA Occasional Paper No. 2 (New Delhi, 1980).


35 Lord Zuckerman in Franklyn Griffiths and John C. Polanyi, eds., The Dangers of Nuclear War (Toronto, 1979), pp. 184-5.
acceptability of tactical nuclear weapons and theatre war in Western strategic thinking, Subrahmanyam argues that in an actual war situation, given the nature of command and control, it would be impossible for US to maintain control over its nuclear weapons in Europe. With a simple "prior release" consent, the crypto nuclear weapon states would be in a position to use nuclear weapons. This is in clear violation of Articles I and II of NPT.

The failure of the NPT was evident at the two review conferences held at Geneva in 1975 and 1980. At the First Review Conference, the nuclear weapon powers which had pre-harmonised their strategy, were successful in stonewalling the criticism and demands of the non-nuclear powers. The nuclear weapon powers had nothing substantive to offer and their cynicism was made obvious by a categorical non-acceptance of all the proposals, symbolised by a giant nuclear test explosion of the US in the middle of the conference. Although the conference was seen as a confrontation between nuclear "haves" and nuclear "have nots", the non-nuclear powers could not put up an united front, to wrest some concessions. The role of the non-aligned countries at the conference was an uncommonly muted one.


One of the major reasons was that the "nuclear weapon powers had schemed to make the conference impotent by rushing and railroading it". The non-nuclear countries attempted to force the nuclear weapon powers to accept some disarmament measures. They introduced three draft protocols, the first dealing with a comprehensive test ban, the second with SALT and the third with nuclear security guarantees. These were rejected by the nuclear weapon states. They also demanded, under Article IV of NPT, increased assistance from developed to developing countries, in the use of nuclear energy for peaceful purposes. The response to this meek statement was the London Club Guidelines restricting further the international nuclear cooperation.

It was expected that the developing countries would put up a better and more united show at the Second Review Conference in 1980. And they did launch a concerted attack, particularly on the West for aiding Israel and South Africa in acquiring clandestine nuclear weapon capability. At the conference "there was disarray among the Western powers, 39


unwillingness on the part of the superpowers to give any concessions on nuclear arms control, and inflexibility in the demands of the non-aligned". The Second Review Conference was a worse failure than the First. The 1975 Conference produced a final document, although a very weak one. The 1980 Conference ended without any final statement, and has been termed a "Sisyphean exercise".

The major share of the blame must be placed squarely on the intransigence of the United States and Soviet Union in refusing to commit themselves to any programme of nuclear disarmament, under Article VI. The developed nations, as a whole, were attacked for forming a nuclear cartel and restricting access to nuclear technology for peaceful purposes, thus violating Article IV. The developing countries also demanded increased nuclear technical assistance in the form of a special fund to be established under IAEA. The industrial nations of west Europe resisted the moves for universal application of fullscope safeguards, and also the move for explicitly prohibiting a non-nuclear weapon state from aiding another non-nuclear State in acquiring nuclear weapons.

According to Subrahmanyam, the Second Review Conference "has helped to rip the mask off the face of NPT and reveal the


45 Barnaby, n. 43, pp. 7-8.
ugly reality underlying the treaty -- namely its being utilised as an unbridled license for proliferation by three nuclear weapon powers supported by their military allies from the industrial world".

INTERNATIONAL ATOMIC ENERGY AGENCY (IAEA)

The proposal for an International Atomic Energy Agency was part of the American "Atoms-for-Peace" package of 1953. After a series of sensitive negotiations that lasted almost two years, the statute of the International Atomic Energy Agency was opened for signature on October 29, 1956. The main objective of IAEA is expressed in Article II of its statute:

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

Thus the primary purpose of the IAEA was to promote and facilitate the peaceful uses of atomic energy for the welfare of mankind. International safeguards were intended not to be an end in themselves but only as a means to ensure that the


48 Statute of the IAEA (Vienna, March 1967).
nuclear assistance provided by or through the IAEA would not be misused for military purposes.

**Evolution of IAEA Safeguards Regime**

The international nuclear safeguards administered by the IAEA have important international political significance for a number of reasons. First, they symbolise an unequal relationship between nuclear weapon states and non-nuclear weapon states; safeguards are required for non-nuclear weapon states, but not for nuclear weapon states. Second, the institution of safeguards is probably the first occasion in international history when technology and politics have been so completely intertwined on a global scale. Third, international safeguards provide a precedent and perhaps a potential model for the future relationship between highly advanced technologies and international organisations. Fourth, the IAEA-NPT safeguards system imposes a limitation on the national sovereignty, and this limitation relates to the area traditionally regarded as the heart of sovereignty - national security.

The basis for the IAEA's safeguards system is in the

Article III of the IAEA statute. There are basically two types of safeguards agreements which the IAEA enters into: (1) those based on the document INFCIRC/66/Rev. 2 for states which are not parties to the NPT; (ii) those based on the document INFCIRC/153 for those states which are party to the NPT, or for those non-parties to the NPT which have agreed to apply safeguards to all their nuclear activities.

The first INFCIRC/66 document was adopted by the IAEA Board of Governors on January 31, 1961. The document was reviewed in 1963 and 1964 and resulted in 1965 in a new safeguards document known as the Agency's Safeguards System, 1965. After the NPT entered into force on March 5, 1970, the Safeguards Committee of the IAEA Board of Governors drew up a set of recommendations for the content of the relevant safeguards agreement to be concluded with the non-nuclear weapon states party to the NPT. This was a draft agreement

50 Article III A, 5 of the Statute set out the Agency's functions in regard to safeguards. It authorizes the IAEA: To establish and administer safeguards designed to ensure that special fissile materials 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 parties, to any bilateral or multilateral arrangement, or at the request of a state, to any of that state's activities in the field of atomic energy.


52 IAEA, The Structure and Content of Agreements Between the Agency and States Required in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons, INFCIRC/153 (Vienna, 1972).
and the text (INFCIRC/153) has formed the basis for every safeguards agreement so far concluded by the IAEA pursuant to NPT.

The objectives of IAEA safeguards are defined in INFCIRC/153 as being the "timely detection of diversion of significant quantities of nuclear material from peaceful nuclear activities to the manufacture of nuclear weapons or other nuclear explosive devices or for purposes unknown..." Similar objectives are pursued in applying safeguards in countries not party to NPT, taking into account specific features of provisions set out in INFCIRC/66/Rev. 2 and related agreements.

In meeting the above objectives, the IAEA uses the following basic concepts in verifying the information supplied by the states: (i) effective safeguarding of the flow of source and special fissionable material by the use of instruments and other techniques at certain strategic points; (ii) the periodic closing of material balances by the taking of physical inventories and their verifications; (iii) independent verification by the IAEA of the entire accounting for nuclear material subject to safeguards using chemical analysis and non-destructive measurements; and (iv) the use of containment and surveillance as important complementary measures to materials accounting and to provide

an additional detection capacity. The IAEA, however, undertakes (i) to avoid hampering a state's economic and technological development; (ii) to avoid undue interference in a state's peaceful nuclear activities; (iii) to carry out its function in a manner consistent with prudent management policies; and (iv) to protect commercial and industrial secrets and other confidential information by restricting its dissemination, according to practices agreed to by both the state and the Agency.

As of August 1, 1980 NPT safeguards agreements had entered into force for 60 of the 110 non-nuclear weapon states party to the Treaty. For the remaining non-nuclear weapons states party to the Treaty, the relevant safeguards agreements had not entered into force. However, most of these states had no significant nuclear activities. Venezuela and the Republic of China (Taiwan) are the only non-nuclear weapon states with significant nuclear activities which have not yet completed the procedures required for bringing their agreements with the Agency into force. However, all nuclear activities in these states are covered by safeguards under previous agreements.

55 INF/CIRC/66/Rev. 2, n. 51; INF/CIRC/153, n. 52.
As far as the eleven non-nuclear weapon states not party to the NPT but which have substantial nuclear activities -- Argentina, Brazil, Chile, Colombia, the Democratic People's Republic of Korea, India, Israel, Pakistan, South Africa, Spain and Turkey, the IAEA by the end of 1979 was applying safeguards. In six of these eleven (excluding India, Israel, Pakistan, South Africa and Spain) all substantial nuclear activities of which the Agency was aware were covered by a mosaic of individual safeguards agreements. In four of these eleven states -- India, Israel, South Africa and Spain -- and in Egypt, which has signed but not yet ratified the NPT, unsafeguarded facilities are in operation. (See Tables I and II) It is also reported that Pakistan is clandestinely constructing facilities for uranium enrichment and fuel reprocessing.

Of the six developing nations studied in Chapter II, Mexico and South Korea are already parties to the NPT. Of the remaining four, which have neither signed NPT nor accepted fullscope safeguards, India and Pakistan have unsafeguarded facilities. In Argentina and Brazil, all nuclear facilities are under safeguards. Argentina perhaps has the capacity to build unsafeguarded facilities in future. However, Argentina has signed the Treaty of Tlatelolco and is

57 IAEA, Activities under Article III of NPT, n. 27, p. 8.
58 Ibid., p. 7.
Table I

COUNTRIES HAVING SIGNIFICANT UNSAFEGUARDED NUCLEAR FACILITIES

Egypt*
India
Israel
South Africa
Spain**
Pakistan*** (?)

* The unsafeguarded plant is a small research reactor provided by the USSR.

** The unsafeguarded plant is a nuclear power reactor operated jointly with France.

*** As Pakistan is neither a party to NPT nor subject to fullscope safeguards, the IAEA is not in a position to verify recent reports of facilities under development in Pakistan.

### Table II

**OPERATING NUCLEAR FACILITIES NOT SUBJECT TO IAEA OR BILATERAL SAFEGUARDS, AS OF DECEMBER 31, 1980**

<table>
<thead>
<tr>
<th>Country</th>
<th>Facility</th>
<th>Indigenous or imported</th>
<th>First year of operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egypt</td>
<td>Inshas research reactor</td>
<td>Imported (USSR)</td>
<td>1961</td>
</tr>
<tr>
<td>India</td>
<td>Apsara research reactor</td>
<td>Indigenous</td>
<td>1956</td>
</tr>
<tr>
<td></td>
<td>Cirrus research reactor</td>
<td>Imported (Canada/USA)</td>
<td>1960</td>
</tr>
<tr>
<td></td>
<td>Purnima research reactor</td>
<td>Indigenous</td>
<td>1972</td>
</tr>
<tr>
<td></td>
<td>Fuel Fabrication Plant at Trombay</td>
<td>Indigenous</td>
<td>1960</td>
</tr>
<tr>
<td></td>
<td>Fuel fabrication plant, Candu type of fuel elements, at the Nuclear Fuel Complex, Hyderabad</td>
<td>Indigenous</td>
<td>1974</td>
</tr>
<tr>
<td></td>
<td>Reprocessing plant at Trombay</td>
<td>Indigenous</td>
<td>1964</td>
</tr>
<tr>
<td></td>
<td>Reprocessing plant at Tarapur</td>
<td>Indigenous</td>
<td>1977</td>
</tr>
<tr>
<td>Israel</td>
<td>Dimona research reactor</td>
<td>Imported (France)</td>
<td>1968</td>
</tr>
<tr>
<td></td>
<td>Reprocessing plant</td>
<td>Indigenous (in collaboration with France)</td>
<td>1968</td>
</tr>
<tr>
<td>Pakistan</td>
<td>Fuel fabrication plant at Chashma</td>
<td>Indigenous (in collaboration with Belgium)</td>
<td>1980</td>
</tr>
<tr>
<td>South Africa</td>
<td>Pilot enrichment plant</td>
<td>Indigenous (in collaboration with FR Germany)</td>
<td>1975</td>
</tr>
<tr>
<td>Spain</td>
<td>Vandellos power reactor</td>
<td>Operation in cooperation with France</td>
<td>1972</td>
</tr>
</tbody>
</table>

*contd. on next page*
Table II (contd.)

a. Significant nuclear activities outside the five nuclear weapon states recognised by NPT.

b. Assistance by Saint Gobain Techniques Nouvelles.

c. Assistance by Belgo-Nucleare.

d. Cooperation between STRAG (FRG) and UCOR of South Africa.


under pressure to ratify it. And Article 13 of the Treaty of Tlatelolco requires states party to it to enter into fullscope safeguards agreements with the Agency. "The terms of the safeguards agreements under the Tlatelolco Treaty are practically identical to those of NPT type safeguards agreements with some variations to take into account the different terms of both treaties. States party to the Tlatelolco Treaty are under an obligation to submit all their nuclear activities to IAEA safeguards". And the IAEA is already negotiating safeguards with Argentina under Article 13 of the Treaty of Tlatelolco.

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61 IAEA, Activities Under Article III of NPT, n. 27, pp. 6-7.

62 Ibid., pp. 7-8.
Thus besides the almost universal coverage of IAEA safeguards regime, the effectiveness of the safeguards can be seen from the fact that the Director-General's Safeguards Implementation Reports (SIR) for 1978 concluded that the nuclear material under Agency safeguards "remained in peaceful nuclear activities or was otherwise adequately accounted for".

**IAEA: Promotion or Regulation?**

Over the years, there has been increasing criticism from Western quarters that the IAEA, instead of regulating nuclear energy, which is allegedly its primary aim, has been promoting nuclear energy. According to Steven Baker, the IAEA has been seeking to promote nuclear energy in the Third World -- first by conducting economic and technical studies to demonstrate nuclear energy's viability, and then by urging nuclear firms to invest in productive capacity to meet the demand projected by IAEA. In a more strident fashion, The Economist argued that nuclear regulation and nuclear promotion are inconsistent and that there has been a tremendous growth in the promotional business of IAEA. It went on to argue: "Most northerners should not want a body (IAEA) that their taxpayers help finance to be persuading the General Amins of the world to make uneconomic decisions in

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63 Ibid., p. 8.

64 The IAEA conducted a series of nuclear power feasibility reports for a number of Third World countries during 1971-75.

favour of energy systems from which local nuclear bombs could be a by-product". Rotblat also criticises the IAEA for pursuing "most diligently and effectively" the promotional aspects of nuclear energy and for still considering that this should be the chief task of the Agency.

The attitude of the developed countries to IAEA has become one of an institution to regulate and control nuclear energy. They want the promotional aspect of IAEA to become peripheral. This is a blatant violation of the understanding of the IAEA statute which clearly defines promotion as the primary aspect and regulation was only to ensure that nuclear assistance was not diverted to military purposes.

The change in the attitude of the developed countries and of the IAEA by a shift in emphasis from promotion to regulation came about with the emergence of NPT, and the incorporation of IAEA into the NPT regime. As early as 1968, when the NPT had just been signed, the Director General of IAEA at the Twelfth IAEA General Conference in 1968 pointed out: "When the NPT is in force there will have to be a shift of emphasis in the work of the IAEA. More weight will have to be given to the control functions." Expressing concern on

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this, Vikram Sarabhai, the Chief of Indian delegation said:

... the Agency's primary role has been clearly stated in its statute and in its Articles, and the control function, which is an essential and necessary function is an adjunct to the more positive uses of atomic energy. I believe that one has to particularly safeguard the Agency's effort in the more positive directions, because without this, the regulatory function will become rather meaningless for the many countries which have still to taste the fruits of the benefits of atomic energy. 69

Throughout the 1970s, India and other developing nations were protesting against the growing emphasis on safeguards, reflected in the rising budgetary allocations of IAEA on safeguards. The Third World countries also protested against the decrease in real terms of the amount of direct technical assistance provided by IAEA. A look at the figure of the IAEA spending on safeguards justifies the Third World criticism of IAEA. The expenditure on safeguards as a percentage of the total budget of the IAEA has risen from 14.01 in 1975 to 22.3 in 1979. The US $17 million which the IAEA spent in 1979 on safeguards was twice the US $8.6 million spent on direct technical assistance to member countries.

Some developing countries protested against the revised rules of IAEA for providing technical assistance to member countries.

69 Ibid., p. 216.
countries, in favour of nations party to NPT. India argued that the revised rules were discriminatory and contrary to the provisions of the IAEA statute which made no distinctions between parties and non-parties to the NPT. Pakistan and Brazil also voiced concern over the growing tendency in the IAEA to distinguish between parties and non-parties in the NPT in the technical assistance programme. India decided to forgo all technical assistance from the IAEA, but she would continue to participate in the technical assistance programme in the capacity of a donor. Following India's lead, Argentina also withdrew from the IAEA's assistance programme. According to Castro Madero, head of Argentine National Commission on Atomic Energy (CNRE), Argentina was withdrawing because of the inadequacy of the level of technical assistance provided by the IAEA.

Through the 1970s, the IAEA clearly emerged as a "nuclear policeman", with its original purpose of a "nuclear

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73 Indian delegate Dr. Razi Ahmed reported in The Statesman (New Delhi), November 6, 1979.

74 Statement by the Delegate of Pakistan, Munir Ahmad Khan, Chairman, PAEC, at the 23rd Regular Session of the General Conference of IAEA, New Delhi, December 4-11, 1979, p. 7.

75 Statement by the Delegate of Brazil at the 23rd Regular Session of the General Conference of IAEA, New Delhi, December 4-11, 1979.

76 IAEA, Statement by India, GOV/OR 529, para 17, February 1979.

77 IAEA, Statement by Argentina, GOV/OR 531, para 53, and GC XXII/CR. 201, para 74, June 1979.

78 The Hindu (Madras), December 8, 1979.
promoter" being sidestepped. The emphasis on regulation when most of the developing countries have not even tasted the fruits of three decades of atomic energy development makes a mockery of IAEA's objective of "accelerating and enlarging the contribution of atomic energy to peace, health and prosperity throughout the world". As pointed by an observer, conceived as an "atomic Robin Hood", IAEA has been transformed into an "atomic sheriff". At the 23rd session of the IAEA General Conference held at New Delhi in December 1979, the developing countries made a determined bid to bring about some changes in the functioning of IAEA. They demanded increased technical assistance for their peaceful nuclear programmes. They pointed out that even as the costs of nuclear technology grew, the value of technical assistance remained a pittance in comparison to the cost of a nuclear reactor. The Third World also demanded an increased representation in the Board of Governors - the actual decision-making body - which is controlled by the developed nuclear countries. The developing countries could not force the issues in the face of procrastinating tactics of the Western countries, and the lack


81 Statement by the Brazilian Delegate, n. 75.

82 Statement by the Pakistani Delegate, n. 74.
of support from the Soviet bloc.

An interesting outcome of the New Delhi session of IAEA, was the suggestion of Sigvard Eklund, Director General of IAEA, for the setting up of a committee by IAEA to evolve guidelines which would provide adequate assurances of continued supply of nuclear material. Eklund said that when a developing country invests resources of the order of a billion dollars in a nuclear plant, and is prepared to accept NPT or comparable safeguards, it is legitimate for it to expect the uninterrupted supply of fuel during the life of the plant. Irrevocable safeguards must be accompanied by irrevocable supply assurances. The suggestion of Eklund was concretised in the form of a IAEA Committee on Assurances of Supply (CAS), the first meeting of which took place in September 1980. The Group of 77 countries lobbied to elect one of their representatives as a permanent chairman of CAS, but finally conceded to a one year term. As a concession, CAS members subsequently decided to have three vice-chairmen, one from OECD group, one from socialist bloc and one from Group of 77. Each of the four CAS officers will have a one-year term. In addition the CAS chairmanship will rotate annually in the following order: Group of 77, OECD, Socialist. It is a measure of the influence of Group of 77 that the group will always hold two of the four CAS officer positions. That is the Group of 77 will always have either the CAS chairman

83 "IAEA Shelves Developing Nations' Demands", n. 72, pp. 10-11.
84 Ibid.
and one vice-chairman, or two vice-chairmen.

THE NUCLEAR SUPPLIERS GROUP (NSG)

After the Indian nuclear explosion of May 1974, there was a growing perception among the protagonists of nuclear non-proliferation that the existing non-proliferation regime was inadequate. Several nuclear exporting countries decided to meet in order to devise more stringent rules for nuclear exports, and thus control nuclear proliferation. The meetings began in London since 1975 and took place under great secrecy and the Nuclear Suppliers Group came to be known as the London Club.

The initial membership of the Club was seven -- Canada, France, FRG, Japan, the UK, USA and USSR. The membership was expanded to fifteen to include Belgium, Czechoslovakia, GDR, Italy, the Netherlands, Poland, Sweden and Switzerland. The London Club came out with a set of Guidelines for Nuclear Transfers, which contained a catalogue or a "trigger list" of equipment and material, which, when provided to any non-nuclear weapon state, would trigger the IAEA safeguards. The NSG trigger list was an expanded version of an earlier list evolved by an older...

88 For the guidelines and Trigger List, see, SIPRI Year Book 1978 (Stockholm, 1978), pp. 35-42.
club of nuclear exporters, the Zangger Committee, set up to interpret and implement the safeguards clause of the NPT.

Article III.2 of NPT obliges the signatories not to make available fissionable materials or special equipment to any non-nuclear state whatsoever, including those which are non-signatories to the treaty, unless these materials and equipment are covered by IAEA guarantees. In pursuance of this provision, its practical implementation was formalised in August 1974 under an arrangement among the countries exporting fissionable materials and equipment (the USA, UK, USSR, FRG, Canada, and others). They also agreed on a list of nuclear materials and equipment whose delivery to any non-nuclear weapon country would entail the establishment of IAEA control. This list was known as the Zangger list, having been named after the Swiss representative Claude Zangger who led the group of specialists that worked it out. Twenty-two exporting countries are signatories to the August 22, 1974 agreement.

The NSG list went beyond the Zangger list and represented a stricter approach to nuclear technology transfer. The materials on the NSG trigger list include the fissile materials Pu-239, U-233, and U-235 (in enriched Uranium) in quantities greater than 50 g per year, natural uranium in quantities greater than 500 kg per year; and thorium and

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depleted uranium in amounts greater than 1,000 kg per year. This list also includes specified quantities of other materials used in reactors, such as deuterium, heavy water or high-grade graphite. Among the installations are nuclear reactors which produce more than 100 g of plutonium per year, plants for the fabrication of fuel elements and their reprocessing. Different types of enrichment plants and heavy water production plants are also listed. The auxiliary equipment includes pressure vessels, control rods, pumps for circulating the coolant as well as other components of nuclear installations.

Transfer of items identified on the trigger list would be authorised only upon formal government assurances from recipients explicitly excluding uses which could result in the manufacture of nuclear explosives; the materials and facilities in question would have to be placed under physical protection to prevent unauthorised handling. The duration of the safeguards agreements would be related to the period of actual use of the relevant items in the recipient states. These requirements will also apply to facilities utilising technology directly transferred by the supplier, or derived from transferred facilities, or major critical components thereof.

At the same time, the suppliers pledged themselves to exercise "restraint" in the transfer of "sensitive" facilities, equipment or technology and weapons-usable materials. Retransfer of trigger list items will be subject to controls and, in certain cases, the consent of the original supplier will be required. The suppliers will consult each other and other governments on specific sensitive cases to ensure that any
transfer does not contribute to risk of conflicts or instability. In the event of a violation of supplier/
recipient understandings resulting from the guidelines, particularly in the case of an explosion of a nuclear device, or illegal termination or violation of IAEA safeguards by a recipient, suppliers should consult through diplomatic channels an appropriate response and possible action, which could include the termination of nuclear transfers to that recipient. (For a comparison of the Langger list and MSF guidelines, see Table III).

The idea of nuclear suppliers cartel was generally welcomed among the Western analysts, as a move in the right direction to control nuclear proliferation. A typical view was: "A nuclear exporters cartel is the most promising multilateral initiative -- as distinct from particular policies tailored to individual states -- for preventing the spread of nuclear weapons." The Soviets viewed the London Clubb guidelines as conducive to a stronger non-proliferation regime. In the Western literature, the proposal for a nuclear cartel, originated from Steven Baker and Senator Abraham A

93 Zhelezov, n. 90, pp. 46-52.
94 Steven J. Baker, "Monopoly or Cartel?", Foreign Policy, no. 23, Summer 1976, pp. 202-20.
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<tr>
<td><strong>1.</strong> Seeks to implement the NPT</td>
<td>Seeks to go beyond the NPT,</td>
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<td><strong>2.</strong> Stresses the NPT obligations of NPT parties who are also the major nuclear suppliers.</td>
<td>Stresses the anti-proliferation obligations of the NPT states and particularly of the great powers.</td>
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<td><strong>3.</strong> Views the NPT as the terminal condition, which first requires an implementation of the NPT bargain (namely, the balance between Article III and IV, and between Articles II and VI); sees the NPT as the framework for negotiating a balance between nuclear supply and nuclear safeguards relations.</td>
<td>Avoids a specific commitment to implementing these bargains and at least puts the debate about bargains aside; views the NPT as the starting point for establishing a nuclear suppliers' consensus against particular supplies to potential horizontal proliferators.</td>
</tr>
<tr>
<td><strong>4.</strong> Stresses agreement about the conditions of supply, including reprocessing and enrichment technology transfers and equipment sales.</td>
<td>Requires suppliers not to offer sensitive equipment and technology relating to reprocessing and enrichment. So the focus is on strengthening, through a multilateralised regime, the existing unilateral restrictions on supplies rather than on strengthening the safeguards conditions of supplies including sensitive items.</td>
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<td>5. Is satisfied with the acceptance of IAEA safeguards instead of the fullscope NPT safeguards; hence absolutism and rigidity are avoided.</td>
<td>Is motivated by a concern to move toward fullscope safeguards, but at present suppliers have failed to reach consensus on this point.</td>
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<tr>
<td>6. Sees the importance of fulfilling treaty obligations; hence stresses the role of NPT as an international legal instrument where the bargain must be kept.</td>
<td>Views the NPT as a political rather than a legal instrument because circumstances underlying NPT negotiations in the mid- to late 1960s changed in the 1970s; hence there is a need to strengthen the anti-proliferation regime that covers the NPT's weaknesses, that is, its withdrawal clause.</td>
</tr>
<tr>
<td>7. Stresses the role of trust.</td>
<td>Downplays the role of trust in nuclear matters.</td>
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Ribicoff. The proposals meant a sharing of the world market among the nuclear suppliers, and thus avoid competition among themselves and to ensure that safeguards and proliferation concerns are not bypassed in the drive for nuclear sales. The nuclear cartel, it was hoped, would accomplish at least the following two objectives: (i) the cartel would force a nation to make its intentions to fabricate a bomb clearer much earlier in the process of doing so than would otherwise be the case; and (ii) it would no longer be possible to proceed toward the making of a weapon under the pretext of establishing a programme of nuclear energy. This would raise the financial and political price of a bomb.

The formation of the nuclear cartel was not a smooth and easy affair. The gulf between the nuclear policies of North America and Western Europe could not be narrowed easily. France for quite some time was unwilling to be associated publicly with the cartel. It was mainly due to the unwillingness of France and West Germany that the cartel did not agree on fullscope safeguards. However, France and Germany also conceded to North American pressure and decided not to export any more reprocessing plants. It was these differing approaches which resulted in the

96 Mandelbaum, n. 92, pp. 49-50.
98 Ibid.
non-insistence of fullscope safeguards and the demand only of "restraint" in the transfer of sensitive technologies but not a total moratorium on export of sensitive nuclear facilities.

The Third World viewed with suspicion the secret negotiations held in London outside the framework of the IAEA. The feeling in the Third World was that the nuclear supplier states were more concerned about maintaining their technological dominance of the international nuclear market -- "atomic colonialism" -- than in curbing the spread of nuclear weapons. Nuclear officials in the Third World rejected the argument that the mere acquisition of an enrichment and/or reprocessing facilities automatically implied that the nation will acquire nuclear weapons. Citing the examples of Japan and West Germany as states that have the capacity to build nuclear weapons but have chosen not to do so, the Third World officials stated that continued US opposition to the acquisition by their countries of such facilities infringes on their national sovereignty and the Article IV of NPT.

The London Club was clearly an attempt by the Nuclear suppliers to reduce the competition among themselves, to turn a buyers nuclear market (favourable to Third World) into a

99 Ibid.


sellers market (unfavourable to Third World). It was also an attempt to resolve the contradiction between nuclear commerce and nuclear proliferation on the one hand and the contradictory policies of Northern America and Western Europe on the other (with the Soviet Bloc generally supporting the North American positions on non-proliferation).

The London Club went one step beyond the NPT, and denied certain so called "sensitive" technologies even for civilian purposes. Pointing out that the Third World countries have "considerable justification for their outrage" at the London Club guidelines, a Western observer argued:

Far from furthering the intent of Article IV, nuclear supplying nations have produced a more restrictive trade posture. In ratifying the NPT, the non-nuclear weapon states clearly accepted discrimination with respect to weapons development; they were not prepared to accept -- indeed, signed the NPT to prevent -- discriminatory treatment in civilian nuclear energy utilization. 105

Another observer from the West lamented the fact that in going beyond the NPT to further restrict international nuclear commerce, the failure to distinguish between non-nuclear


104 P.R. Chari, "Will Nuclear Technology be Cartelised", INSA News Review on Science and Technology (New Delhi), September 1976, pp. 473-5.

states party and not party to NPT, had only alienated those who renounced nuclear weapons, for sake of free access to civil nuclear energy development. This led to the problem of proliferation attaining a North-South character.

Besides the nuclear gray market/the black market which undermine the credibility of the London Club, there are a few other factors too. The history of technology in general, and that of nuclear technology in particular, points out that technology cannot be monopolised for too long. The diffusion of nuclear technological capabilities cannot be reversed, and this would undermine the London Club. Technological innovation is another factor which can undercut the NSG. For example, if India succeeds in developing a mixed oxide fuel (MOX) for its enriched uranium reactors at Tarapur, it can break the dependence on the US for enriched uranium supplies, and on the NSG as a whole. Similarly, the development of laser enrichment techniques can break the enrichment monopoly of the NSG. Another weakening factor is the lack of complete agreement among the NSG on fullscope safeguards and moratorium on sale of sensitive facilities, and the continuing commercial pressures on the nuclear policies of Western Europe.


THE INTERNATIONAL NUCLEAR FUEL CYCLE EVALUATION (INFCE)

In 1977, the crisis in world nuclear industry had come to a head. Two distinct but related areas had become the causes for concern. The Indian nuclear explosion of 1974 and the Brazil-FRG deal of 1975 brought forth the issues of nuclear commerce, nuclear energy for peaceful purposes, safeguards and weapons proliferation. President Carter's policy against plutonium caused deep fissures between the US and Western Europe. The impasse on the nuclear energy front figured in the Western summit meeting of Heads of State and Government in May 1977 at London.

It was at this summit, that Carter initiated the International Nuclear Fuel Cycle Evaluation Programme, and others accepted. The Carter Administration had two political objectives in launching the INFCEP. The first was to create a broader forum where tensions could be diffused as quickly as possible and to prevent a breakdown of the existing nuclear non-proliferation regime. For this purpose, it was necessary to supplement the earlier secretive cartel -- the NSG -- with a more open forum where key developing and developed countries could participate. The second objective was to convince the international nuclear community that the US opposition to

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plutonium was technologically and economically sound.

However, many countries suspected the US motives about INFCEP. The apprehensions were that the US might use INFCEP to discourage the development of nuclear energy worldwide and to bring about international sanction to its nuclear policies. At the INFCEP Organising Conference in Washington during October 1977, foreign delegates insisted that the world 'programme' be dropped from INFCEP and that the final communique describe the forthcoming exercise as a "technical and analytical study and not a negotiation". After considerable pressure, the US accepted this view. The communique went further and stated, that the "participants would not be committed to INFCEP's results" and that:

the evaluation would be carried out in the spirit of objectivity with mutual respect for each country's choices and decisions in this field without jeopardizing their respective fuel cycle policies or international cooperation, agreements and contracts for the peaceful use of nuclear energy, provided that safeguard measures are applied. 113

The Organising Conference established eight working groups (see Table IV) to study the entire gamut of technological issues concerning the design of a more stable nuclear non-

110 Lellouche, n. 97, pp. 337-8.


113 Ibid.
### Table IV

**STRUCTURE OF INFE**

<table>
<thead>
<tr>
<th>Working Group (WG)</th>
<th>Co-Chairmen</th>
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<tr>
<td>WG 1: Fuel and heavy water availability</td>
<td>Canada, Egypt, India</td>
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<tr>
<td>WG 2: Enrichment availability</td>
<td>France, West Germany, Iran</td>
</tr>
<tr>
<td>WG 3: Assurances of long-term supply of technology, fuel, heavy water</td>
<td>Australia, Philippines, Switzerland</td>
</tr>
<tr>
<td>WG 4: Reprocessing, plutonium handling, recycling</td>
<td>Japan, United Kingdom</td>
</tr>
<tr>
<td>WG 5: Fast breeders</td>
<td>Belgium, Italy, Soviet Union</td>
</tr>
<tr>
<td>WG 6: Spent fuel management</td>
<td>Argentina, Spain</td>
</tr>
<tr>
<td>WG 7: Waste Management and disposal</td>
<td>Finland, Netherlands, Sweden</td>
</tr>
<tr>
<td>WG 8: Advanced fuel cycle and reactor concepts</td>
<td>Republic of Korea, Romania, United States</td>
</tr>
</tbody>
</table>

Source: Steven Wernecke, "Non-Proliferation and INFE: An Interim Assessment", *Survival*, vol. 21, no. 3, May/June 1979, pp. 112-19.
proliferation regime, minimising the global distribution of weapons-useable materials and vulnerable points in the fuel cycle, while secure energy needs of all countries. A Technical Coordination Committee (TCC) was to coordinate the work. The subjects of all the working groups were discussed in international forums before, but INFCE was the first to discuss the technical issues from the proliferation point of view. By the first Plenary Conference of the INFCE held in Vienna during November 27-29, 1978, 56 states and 5 international organisations were participating in it.

Farinelli pointed out a number of weaknesses of INFCE. Although INFCE was supposed to be a technical study, it had to confront a number of basically political issues: energy security, national security, economic and environmental impacts of the choices and their influence on the rate of development, etc. Since it was countries which were represented on INFCE, and already every nation had a specific nuclear policy with an inbuilt momentum, an objective technical discussion was difficult. The novel feature of studying nuclear fuel cycles from the proliferation-resistance point of view was also inherently difficult, because it would be difficult to agree on whether a certain solution is more or less proliferation-resistant than another, let


115 Ibid., p. 425.

alone how much more or less. This difficulty was enhanced by the fact that quantitative and qualitative judgements on proliferation are often based on practical experience that is available only to nuclear weapon states. This bias added "to the apprehension caused by some of the proposed solutions that in fact discriminate between nuclear weapon states and non-nuclear weapon states in regard to installations and technologies related to peaceful applications".

The situation was further complicated by the way in which INFCCE was organised. There was no standing international group to make the actual calculations and evaluations. All the basic work was done in individual countries. The reports of the eight working groups were based mainly on the collection and compilation of the contributions provided by various countries. Further the segmentation of the work among the eight working groups with lack of sufficient coordination among the groups made the functioning of INFCCE difficult.

At the end of INFCCE in February 1980, there were two distinct views regarding its outcome. For those who saw INFCCE as an exercise to curb the growth of nuclear technological development in the name of non-proliferation, it was a disappointment and for those who saw INFCCE from the outset an educational exercise for the benefit of US administration, it was a success.

117 Ibid., p. 262.
One central task which INFCRE was entrusted was to investigate individual fuel cycles with special reference to economy, security of supplies and the risk of proliferation, not forgetting their repercussions on health and environment. INFCRE concluded that the use of atomic energy for peaceful purposes could not be limited to any specific fuel cycle, no generally accepted judgement being possible on whether one fuel cycle is more or less proliferation-prone than another. Each and every country must base its decisions regarding the peaceful uses of atomic energy on the specific technological, ecological, economic, financial and political circumstances in question.

Regarding the security of supplies, INFCRE stressed that reliable long-term supplies were extremely important if effective non-proliferation policies were to be pursued. It was also agreed that there must not, as had happened in the past, be holdups in uranium deliveries or unilateral interpretation or amendment of contract terms by supplier countries, as long as the recipients gave no cause for so doing. Regarding proliferation, INFCRE stressed that proliferation is primarily a political and not a technical matter. The INFCRE took note of the already existing non-proliferation regime to prevent misuse of nuclear fuel cycles for military purposes and the working groups identified and analysed a number of further measures -- technical,

safeguards and institutional -- that could and should be implemented "without jeopardising energy supplies or the development of nuclear energy for peaceful purposes". In general INFCE concluded that technical measures have a powerful influence on reducing the risk of theft, but only a limited influence on reducing the risk of proliferation. Safeguards measures were judged more important and institutional measures potentially more important than technical ones.

The second major outcome of INFCE was its usefulness as a forum to narrow down the differences between the North American nuclear policies on the one hand and the European and the Japanese policies on the other. There was a better appreciation by the US of the energy security concern of West Europeans and Japanese and a better appreciation of US proliferation concerns by the US allies. By the end of INFCE, the US had diluted its total opposition to plutonium reprocessing and breeders. The US conceded the development breeders but opposed recycling of plutonium. The INFCE concluded that breeders were necessary but recycling of plutonium in thermal reactors of plutonium in thermal reactors was not necessary. Both France and the UK veered round to this position. Thus on the vexed question of

121 Ibid.
122 Fishlock, n. 118.
plutonium some consensus seems to have emerged.

Third, while there was a general opinion that INFCE represented a setback for the nuclear policies of Carter, INFCE can also be seen as a success for the American nuclear industry which had been campaigning for reprocessing and breeders. The US nuclear industry was trying to reverse Carter's policies on reprocessing and breeder by citing INFCE findings. And at the level of President Carter's cabinet a document authored by Gerard J. Smith, the US special ambassador on non-proliferation, proposed to soften or withdraw altogether US opposition to breeders. Thus INFCE might be influential in bringing shifts in US nuclear policy.

Fourth, a general consensus emerged at INFCE among the developed countries that the prototype of several new institutions needed to tighten safeguards and to provide assurances of supply could be the international plutonium storage scheme. It was proposed that plutonium separated from spent nuclear fuel above a country's research and fast breeder requirements would be made the responsibility of the International Atomic Energy Agency.


125 Financial Times (London), March 7, 1980.
Thus while the DIFE managed to narrow down differences among the developed countries over nuclear policies and had even generated a consensus on strengthening the international nuclear non-proliferation regime, the Third World was left out in the cold. There was general dissatisfaction among the Third World countries over the outcome of DIFE. While a large number of developing countries (39) participated in the DIFE, the exercise failed to provide satisfactory answers to many problems of interest to them. "It is indisputable that too much attention has been devoted in the study to problems pertaining directly to the industrialised countries." And a disproportionately high degree of importance was attached to the problems of controls and guarantees, i.e., to the enforcement restrictive measures than to the spreading of the benefits of nuclear energy.

Yugoslavia pointed out that the DIFE did not devote sufficient attention to the needs of the developing countries. Brazil argued that the "use of nuclear energy in developing countries has been approached in a restrictive and limited manner, which seems to imply that their greatest contribution would be to increase the exploration and the production of uranium for the benefit of importing developed countries".

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128 Ibid.
Echoing the same sentiments India said:

Both vertical and horizontal proliferation have to be dealt with simultaneously. We have been appealing for a sense of perspective between the real threats posed not only by the existing stockpiles of nuclear weapons but their increasing numbers and sophistication, and the perceived threats posed by the development and acquisition of nuclear weapons by those who do not possess them. 129

India also argued that the limiting of certain nuclear fuel cycle activities to the territories of nuclear weapon states or to areas under their effective control would give them "a permanent technological and economic advantage and widen the gap between developing and industrially advanced countries". 130 India pointed out that such arrangements were "tantamount to surrender of national sovereignty by the vast majority of countries, while enabling a chosen few to effectively dictate the programme which they deem to be appropriate for the peaceful utilisation of atomic energy in other countries". 131

The Pakistani delegate also opposed the confining of certain nuclear fuel cycle aspects to a few countries.

MULTINATIONAL NUCLEAR FUEL CYCLE CENTRES

The increasingly popular ideas of multinationalisation of the nuclear fuel cycle, as a measure of international nuclear non-proliferation regime, need to be discussed. In

129 Ibid.
130 Quoted in _Hindustan Times_ (New Delhi), March 2, 1980.
131 Quoted in Ibid.
In the post-War period, there has been a considerable growth in the number and variety of international institutional arrangements in many fields, often designed to provide a permanent framework for international cooperation, such as that of the specialised agencies of the United Nations. Some of the most successful projects involving international cooperation, however, have been characterised by the pursuit of narrow and clearly defined objectives, and where there has been concrete commonality of interests as in Western Europe, which has made great strides in the high technology fields -- space and nuclear -- through mutual cooperation.

The proposal for "multinational fuel cycle centres" came from Henry Kissinger, the US Secretary of State, on September 22, 1975 in his speech to the United Nations. He called for the establishment of multinational regional nuclear fuel cycle centres which would reduce the incentive for small and inefficient reprocessing facilities, limit the possibility of diverting peaceful nuclear materials to national military use, and create a better framework for applying effective international safeguards. In the NPT Review Conference of 1975, the concept of multinational nuclear fuel cycle centres received general support. The Final Declaration of the First Review Conference of the NPT stated that these centres "may be an advantageous way to satisfy, safely and economically the...

133 For a discussion of the politics of nuclear technology cooperation in Western Europe, see Henry R. Nau, National Politics and International Technology (Baltimore and London, 1974).

needs of many states in the course of initiating or expanding nuclear power programme, while at the same time facilitating physical protection and the application of IAEA safeguards, and contributing to the goals of the Treaty". In pursuance of the above proposals, the IAEA in 1977, issued a report of its study, covering the back-end of the fuel cycle, from the discharge of fuel from power reactors through storage, reprocessing, fabrication of new mixed oxide fuel elements and radioactive waste management. The study did not address itself to the front-end of the fuel cycle.

According to the study, the multinational concept offers a number of advantages in meeting non-proliferation objectives, when compared to the alternative of a further expansion of national capabilities. The most important of these advantages is said to be that the states are offered an incentive to engage in multinational alternatives to national reprocessing and thereby to reduce the number of national facilities constructed. In addition to the possible attractive economic, waste disposal and environmental aspects, inter-governmental agreements envisaged for the fuel cycle centres would enhance controls on the transfer and use of nuclear materials and relevant technologies, and provide for physical protection requirements for the facilities. The centres would be established with application of full IAEA safeguards to their

135 Ibid., pp. 146-56.
activities. But the IAEA conclusions about economies of scale, the promotion of technical development and the desirability of fuel reprocessing in general were immediately challenged. There was also the fear in some quarters that the multinational centres might only accelerate the diffusion of nuclear technology rather than retard it. In spite of the IAEA study, there have been very few concrete proposals for setting up multinational fuel centres, and there is a growing doubt, whether the approach is at all promising.

INTERNATIONALISATION OF THE NUCLEAR FUEL CYCLE

A different approach, which would avoid the drawbacks, from non-proliferation point of view, of the multinational centres, but which would necessitate the extension of the NPT and a tightening of the IAEA safeguards system, is the internationalisation of the nuclear fuel cycle.

The internationalisation of the fuel cycle was also discussed at the DNEC. Besides, over the last few years a number of ways of internationalisation have been

137 Ibid., pp. 7-30.
139 H. Manderhausen, International Cooperation in Nuclear Fuel Services: European and American Approaches (Santa Monica, Ca., 1978).
140 J. Goldblat, "Implications of the Non-Proliferation Treaty", SIPRI, n. 67, pp. 342-3.
141

suggested. A common feature is that while the operation of the power reactors would remain under national control, the sensitive parts of the fuel cycle -- such as reprocessing -- would be carried out only at specific centres operated under international control. Some schemes envisage that enrichment would also come under international control. The advanced converter reactor (ACR), based on denatured uranium and thorium is supposed to lend itself particularly to such arrangements. The plutonium produced in the national reactors could be sent to international centres which would use it in FBRs or LWRs run by MOX fuel, thus combining greater security and better utilisation of fuel. A radical proposal called for an international agreement that the operation of enrichment, fuel fabrication, reprocessing, and waste disposal plants be permitted to be carried out only by, or under licence of an Nuclear International/Fuel Authority (NIFA). The enrichment and fuel fabrication plants, operated under strict control and licence of NIFA, could manufacture fuel elements for different types of reactors and store them in an NIFA bank. After the initial

charging of the reactor, fresh fuel charges would be sold to individual countries, which would be obliged to return spent fuel elements, as well as fissile-bearing discharged materials. These would be stored by DIF, either with or without chemical reprocessing. When necessary, reprocessing of spent fuel elements would be undertaken in plants operated by or under licence of DIF.

The implementation of these proposals would require an extension of existing international agreements relating to the NPT and IAEA. There would be further infringement of national sovereignty, in the sense that nations would have to forgo their rights of enrichment, fuel fabrication and reprocessing, and these rights vested in an international authority. There would arise the need to police the plants operating under this authority and to guard all shipments of materials to and from national reactors. To ensure compliance with the new regulations, the present safeguards system would have to be extended to include provision for the physical security of nuclear facilities operated by individual states.

However, most of the proposals for internationalisation have limited themselves to the legal and technical aspects of the problem, and the many complex and problematic political issues have been evaded. The international political response to any modern high technology is highly intricate, and particularly so in the case of nuclear technology. A number of political issues such as East-West and North-South, development-undevelopment, questions of technology transfer, funding, policing, energy security, national
security, independence and interdependence are intricately intertwined with the question of the internationalisation of nuclear fuel cycle. A number of developing nations have already opposed at INECE any attempt in the name of proliferation to restrict certain aspects of nuclear fuel cycle to certain places. In the case of internationalisation, as more generally, sovereign states are likely to be swayed by an opportunity to serve their own political interests, rather than by someone else's delimitation of their rights.

THE THIRD WORLD RESPONSE TO THE NON-PROLIFERATION REGIME

The important aspect of the Third World response to the international nuclear regime is the strengthening trend of cooperation among developing countries on both political and technological areas. This is not surprising because, international politics in the 1970s have been marked by the "politics of affirmation" by the Third World on a number of important issues such as new international economic order (NIEO). Through the non-aligned movement and the Group of 77, the Third World has acquired considerable clout, in the crisis-


ridden world order in the 1970s. The Third World has successfully brought to the centre stage of international politics, issues such as development, industrialisation, trade, aid, transfer of technology, etc.

Along with the collective political affirmation on various issues, the concept of "collective self-reliance" through Economic Cooperation among Developing Countries (ECDC) and Technological Cooperation among Developing Countries (TCDC) is gaining ground. A growing number of scientists in the Third World are veering around to the view that technological cooperation among Third World nations is crucial for self-reliant development.

**Political Coordination**

The Third World states, through their collective political action in a number of international forums in the 1970s, have successfully brought the nuclear issue into the broader ambit of north-south tangle. The issue of nuclear energy and nuclear weapon proliferation was dramatically brought into North-South ambit in April 1977.

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145 For the view of Abdus Salam of Pakistan, B.M. Udgaonkar and Raja Ramanna of India, see *Times of India* (New Delhi), Sunday Review, January 25, 1981.
In the wake of the formation of the London Club and immediately after the announcement of Carter's nuclear policy in April 1977, a conference on Transfer of Nuclear Technology was held at Persepolis, Iran under the auspices of Atomic Energy Organization of Iran (AEOI). At this Conference, there was a strong and vocal criticism by the Third World representatives of the policies of technology denial being implemented by the nuclear suppliers in general, and the US in particular. At the Persepolis Conference, delegates from the non-aligned nations including Yugoslavia, Pakistan, India and Egypt tried to draft a strong joint statement opposing Carter's nuclear policy, but the attempt did not succeed. These developments, perhaps, led to the reports that a "Persepolis Club" was formed to counter the London Club. However, at the Salzburg Conference of the IAEA on the nuclear fuel cycle held in May 1977, Akbar Etemad of Iran reporting on the proceedings of the Persepolis Conference, denied the existence of any Persepolis Club. Etemad, however, did point out that: "There is of course, what I would call a 'spirit of Persepolis', but it is the spirit of a kind of 'anticlub' where all can express their views frankly and discuss matters frankly." He revealed that at least 10 to 15 developing countries were interested in an institutional

147 Nuclear News, vol. 18, no. 6, April 21, 1977, p. 2.
mechanism for transfer of nuclear technology.

Yugoslavia was one of the non-aligned nations which took very keen interest in the problems of nuclear technological development in the Third World. During April 1977, Yugoslavia launched a strong attack on the nuclear policies of the nuclear supplier nations. Yugoslavia denounced the non-proliferation policies of supplier countries as attempts "to keep a firm hold of their monopoly over nuclear energy" and called the London Club "a gigantic world cartel of nuclear powers which in the interests of its members, seeks to dictate nuclear policy to the rest of the world community".

As early as August 1975, Yugoslavia proposed at the Ministerial Conference of Non-Aligned Nations in Lima, Peru, (i) to increase non-aligned nations' efforts to coordinate activities designed to ensure, through existing international organisations such as the IAEA, maximal assistance for the effective transfer of nuclear technology; (ii) the non-aligned and developing countries review their own achievements and also technological, financial and other resources in order to improve coordination in this area; and (iii) work towards this and proceed at the level of experts. The Lima Conference declared to expand cooperation among non-aligned and other

149 Ibid., p. 659.


151 Ibid., no. 650, p. 23.
developing countries to new areas such as "the application of nuclear energy for peaceful purposes, strengthening of their role and coordination within IAEA, mutual cooperation in source materials, applied research and technology, training of personnel, etc., and invite non-aligned countries to undertake initiatives and actions in these areas." The proposal obtained the support of the Fifth Summit of Non-aligned Countries at Colombo, in 1976. At the New Delhi meeting of the Coordinating Bureau of the non-aligned in April 1977, Yugoslavia proposed to extend cooperation among the non-aligned to cover the nuclear fuel cycle, aimed at a "more rapid emancipation" of these countries in the nuclear technological field. The Yugoslav proposals envisaged a long-term plan to develop nuclear technology and break the monopoly of London Club. The Bureau in its Final Communique while demanding nuclear assistance from developed countries on "terms and conditions that show greater appreciation and understanding of energy requirements of developing countries", also considered that the non-aligned should, "in their mutual interests and to the extent possible


153 Ibid., p. 208.

develop various forms of practical cooperation among themselves.

At the United Nations Special Session on Disarmament (UNSSOD) in 1978, the non-aligned and non-party nations to the NPT successfully prevented the Final Document from giving a call to universal adherence to NPT. Moreover the Document emphasised the reduction and elimination of nuclear weapons, and that the non-proliferation measures should not jeopardise the "full exercise of the inalienable rights" of the countries to develop nuclear energy for peaceful purposes in accordance with their needs, interests and priorities. The Document also called for "international cooperation for the promotion of the transfer and utilization of nuclear technology for economic and social development especially in the developing countries".

The UNSSOD, perhaps for the first time, revealed a momentum in the superpower - Third World dialogue on nuclear proliferation.

The Sixth Summit Conference of the non-aligned nations at Havana in September 1979, went a step further and deplored

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157 Ibid., paragraph 65.

158 Ibid., paragraph 68.

159 Ibid., paragraph 70.

the "pressures and threats against developing countries aimed at preventing them from pursuing their programs for the development of nuclear energy for peaceful purposes". The Final Declaration also "stressed the exceptional importance of international cooperation among the non-aligned and other developing countries in the field of peaceful use of nuclear energy. This cooperation is of special significance in the fields where these countries can achieve a greater degree of self-sufficiency".

The trend towards nuclear cooperation among the non-aligned was concretised, when a non-aligned Coordination Committee on Peaceful Uses of Nuclear Energy was formed, at the meeting of the Non-Aligned Foreign Ministers Conference, at Belgrade in 1978. The first regular meeting of this Committee was held at Buenos Aires, Argentina, from June 30 to July 4, 1980. Eleven of the sixteen member countries (Algeria, Argentina, Cuba, Egypt, Gabon, Indonesia, Iraq, Libya, Nigeria, Pakistan, and Yugoslavia), attended the meeting. Brazil, North Korea, India, Peru, Philippines, Uruguay and Romania attended as observers.

161 Final Declaration of the Sixth Conference of Heads of State or Governments of the Non-Aligned Countries, Havana, September 3-9, 1979 (Havana, 1980), Political Part, para 213.

162 Ibid., para 212.


164 The Patriot (New Delhi), July 2, 1980 and July 5, 1980.

165 Kljun, n. 163, p. 20.
The agenda of the meeting raised two basic questions of crucial importance to the non-aligned and developing countries. First, determining the possibilities and needs of individual developing countries and establishing concrete forms of mutual cooperation; second, problems at international level related to inter-state cooperation in introducing nuclear energy for peaceful purposes. Speaking at the meeting, the chief of Argentine nuclear programme Carlos Castro Madero said that the "non-aligned nations should reject the idea of placing any conditions on the transfer of technology". He also urged the non-aligned to develop a "united and coherent position", and that "none of the nonaligned countries possess, by itself, the financial, human and technical resources necessary to provide the help we all need, and so it is necessary to join forces and try to help each other to achieve results".

The draft document prepared at the end of the meeting called for strict compliance with NPT clauses that guarantee development of peaceful uses of nuclear energy, a halt to the nuclear arms race, to end the excessive influence some members wield in the IAEA, a fresh look at irregularities in IAEA safeguards requirements for technology transfer, and recognition of damage done by restrictive London Club Guidelines. The document also listed nearly 100 areas of nuclear energy suitable for multilateral cooperation between members of the non-aligned movement, and suggested ways of implementing such cooperation.

166 Ibid.
167 Quoted in Nucleonics Week, vol. 21, no. 28, July 10, 1980.
Nuclear Technological Cooperation

Technological cooperation among developing countries is seen increasingly as not only necessary but also feasible. The growing ability of some of the advanced developing countries such as India, Brazil, Argentina, Mexico, South Korea to export conventional technology is now recognised. While there are limitations to such transfers of technology among the Third World countries, the Third World firms are seen to have distinct advantages over the multinationals of the West, in catering to the technological needs of the developing nations. However, the technological cooperation among the non-aligned will have to cross a number of hurdles. The major one being that the countries which can export technology are also the emerging regional powers, and any cooperation which would seem to give the slightest tinge of economic or political dominance is likely to be suspect. Added to this are factors of regional rivalry, which could complicate technological cooperation.

Some Third World scholars have argued, vigorously, the case for "nuclear sharing" among the developing nations as a

169 This trend has been noted in, Sanjaya Lall, "Developing Countries and the Emerging International Technological Order", Journal of International Affairs (New York), vol. 33, no. 1, Spring/Summer 1979, pp. 77-100.


171 A.P. Rana, Sushil Kumar, Shanti Swarup and S.D. Nuni, "Cooperation Among Non-Aligned Countries: Evolution, Principles, Forms and Outcome", Foreign Affairs Reports (New Delhi), vol. 29, no. 4-5, April-May 1980, pp. 30-32.
strategy to counter the increasing restrictions on the dissemination of nuclear technology. It has been suggested that the developing nations:

... can pool their technology and scientific skill for the benefits of nuclear development for peaceful purposes and work out plans for collaborative efforts to set up multinational regional centres of the developing nations to which the more advanced among them should be prepared to offer their expertise and experience, and the more affluent among them money. 172

The nature of this task is challenging and would require of the Third World nations, a "refashioning of their old habits of quarrels, disputes and even security perceptions in order to effect their transition from the pre-industrial to the nuclear age". An analyst has called for the creation of Third World regional nuclear organisations such as "ASIAATOM", "LATINATOM", and "AFRICAATOM" as vehicles of regional nuclear cooperation on the lines of EURATOM. It has also been suggested that joint regional projects for the exploitation of peaceful uses of atomic energy would help to remove the suspicion generated by the state-based nuclear programmes.

The 1970s witnessed a growing number of bilateral nuclear cooperation agreements among the developing nations (see Table V).

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173 Ibid.


### Table V

**BILATERAL AGREEMENTS BETWEEN THIRD WORLD COUNTRIES FOR THE PEACEFUL UTILISATION OF NUCLEAR ENERGY, BY MAJOR THIRD WORLD COUNTRY**

<table>
<thead>
<tr>
<th>Argentina</th>
<th>Brasil</th>
<th>India</th>
<th>Iran</th>
<th>Pakistan</th>
<th>Iraq</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Colombia (1972)</strong></td>
<td><strong>Venezuela (1973)</strong></td>
<td><strong>Bangladesh (1973)</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Ecuador (1973)</strong></td>
<td></td>
<td><strong>Egypt (1962)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>India (1974)</strong></td>
<td></td>
<td><strong>Iran (1977)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Paraguay (1969)</strong></td>
<td></td>
<td><strong>Indonesia (1981)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Peru (1969 and 1977)</strong></td>
<td></td>
<td></td>
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</tbody>
</table>

**Sources:**
- *Economic Times* (New Delhi), March 5, 1981.
Significantly, by the beginning of 1980s, there has been a shift in emphasis in the bilateral agreements from cooperation in elementary nuclear research and training to supply of nuclear services, material and equipment. The recent cooperation agreements between Argentina-Peru, Argentina-Brazil, and Brazil-Iraq are indicative of the emerging trend. Argentina is supplying Peru with a research reactor, and establishment of research centre for nuclear energy. Under the Argentina-Brazil agreement of May 1980, Argentina will supply 240 tons of uranium oxide to Brazil, and will also help Brazil in the manufacture of fuel elements. Brazil in turn will supply heavy nuclear components from its factory NUCLEP. Brazil's 1980 accord with Iraq includes the following areas: uranium exploration, supply of both unenriched and low-enriched uranium, supply of finished fuel elements, supply of equipment and engineering services for reactor construction, exchange visits to research centres and developments of scientific experiments.

**Nuclear Cooperation in Latin America**

Latin America shows great promise to be a model for nuclear cooperation among the developing nations. As an

176 C. Raja Mohan, "Nuclear Cooperation in Third World", *Indian Express* (New Delhi), February 9, 1981.

177 Economic Information on Argentina (Buenos Aires), no. 87, August 1978, pp. 7-9.


integral part of the emerging "new internationalism" of Latin America in the 1970s, the multilateral diplomacy of Latin America and its various regional organisations are in the process of change. With regard to the cooperation among Latin American states on the development of science and technology, a study by Ernst Haas has concluded that the attempted cooperation has not been of much success. Yet some recent developments in the nuclear field are worth noting.

One of the significant events was, as noted earlier, the transfer of a research reactor and expertise to build a research centre in Peru. The 10 MW zero power research reactor is to produce radio-isotopes for medical and industrial purposes. Moreover, a close working relationship is being established between the nuclear energy commissions of Peru and Argentina, and Peruvian personnel are being trained in Argentina. The vigorous Argentine efforts at nuclear cooperation are seen as a manifestation of Argentine ambitions to encourage Chile.


183 Journal of the Institution of Nuclear Engineers (London), vol. 19, no. 6, November-December 1978, p. 193; see also Economic Information on Argentina, no. 87, August 1978, pp. 7-9.
Bolivia, Paraguay and Uruguay to adopt national uranium-heavy water technology, and dominate the future "natural uranium club" as a major supplier of uranium, heavy water and technology. Argentina had made explicit its desire to become a nuclear exporter. So far Brazil has focussed to a far lesser degree than Argentina on bilateral nuclear relationships, emphasising its own national nuclear efforts.

At the multilateral level, the Inter-American Nuclear Energy Commission (CIEN) of the Organisation of American States (OAS) has been carrying out useful work since the early 1960s. The Tenth meeting of the CIEN in July 1977 called for nuclear cooperation among Latin American nuclear nations in a variety of areas, including use of radio-isotopes in industry and agriculture, assistance in training personnel for nuclear power programmes, the sharing of regional experts and a greater exchange of technical information.

Another multilateral initiative has been the creation of the Latin American Energy Organization (OLADE), in 1973 with its headquarters at Quito, Ecuador. The emphasis of OLADE in its work has been to "encourage the formulation and development


185 Carlos Castro Madero of Argentina said: "Our country, besides having embarked on a nuclear programme, intends to be an exporter of nuclear technology in Latin America..." See his "Driving Forces of Proliferation", in Karl Kaiser, ed., Reconciling Energy Needs and Non-Proliferation (Bonn, 1980), p. 178.

186 The Tribune (Chandigarh), July 14, 1977.
of common energy policies as a factor of regional integration\(^{187}\). OLADE has shown interest in nuclear energy.

There was a very significant but unsuccessful effort to create a Latin American coordination group in the nuclear energy area. Spearheaded by Argentina, the Reunión de Autoridades Nucleares de América Latina (RANDAL) met in September 1976 in Rio de Janeiro prior to the 20th General Conference of the IAEA. Consisting of the sixteen members of the IAEA's Latin American group, RANDAL's goals were general in scope: to promote cooperation among Latin American nations in the use of nuclear energy and to take maximum advantage of available international support for nuclear energy development. While Argentina argued for extensive regional nuclear cooperation, Brazil, Mexico and Cuba seemed reluctant.\(^{188}\)

The most politically significant development has been the May 1980 nuclear cooperation agreement between Brazil and Argentina. Interest has been there for quite some time among policy-makers in Brazil and Argentina for increased nuclear cooperation. In 1976, an Argentine strategist called for substantive nuclear cooperation in tandem to resolution of other outstanding bilateral problems. He argued that a potential nuclear arms race between Argentina and Brazil could

\(^{187}\) Redick, n. 184, p. 191.

\(^{188}\) Ibid., p. 179.

\(^{189}\) Juan E. Guglielmelli, "The Brazilian-German Nuclear Deal: A View from Argentina", *Survival*, vol. 18, no. 4, July/August 1976, pp. 262-5.
be prevented by greater nuclear cooperation. Ironically, the US pressure on Brazil regarding the West German deal appeared to stimulate fresh interest in Argentina-Brazil nuclear cooperation. In February 1977, Argentina suggested the desirability of future nuclear cooperation and expressed support for Brazil. In January 1980, it was announced that Argentina and Brazil would sign a comprehensive nuclear cooperation agreement in May 1980. The agreement covered nuclear physics, nuclear chemistry, uranium prospecting, production and processing, manufacture of nuclear fuel elements, and exchange of information and experience in the management of large projects such as nuclear reactor construction. It should be noted that the nuclear cooperation agreement did not happen in isolation but as part of a wider process of cooperation between Brazil and Argentina. There was also agreement on building and launching of a communication satellite and the joint harnessing of waters of the Uruguay river. Earlier in 1979, an agreement was reached over the vexed question of Parana dams, and trade between the two countries has been showing tremendous growth -- 80 per cent in 1979. And there is a growing perception among the business elites of Argentina and Brazil that the two nations have complementary market systems.

190 Redick, n. 184, p. 196.
193 Ibid.
The Argentina-Brazil nuclear cooperation agreement is of tremendous political significance for the Third World. Its importance lies in the fact that it would put an end to arguments used by industrial nations to deny technical assistance to countries like Argentina and Brazil, "because these countries imagine we are embarked on a nuclear arms race and that our rivalry endangers world peace". Madero also pointed out that Brazil could complement Argentina in uniting the other Latin American nations and that they could open up nuclear technology to all the friendly nations without the economic impositions of the developed nations.

The Argentina-Brazil nuclear cooperation augurs well for Latin American nuclear development and at the same time undercutsthe essential arguments of proliferation theories -- models of regional rivalry and chain theories of nuclear proliferation. However, the specific conditions obtaining in Latin America might not obtain in other areas like South Asia and Middle East. For example the Indo-Pak rivalry might not facilitate any real movement towards regional nuclear cooperation.

Cooperation among Third World countries should be aimed at building nuclear infrastructure in the lesser developed Third World nations. The advanced nuclear nations of the Third World


could play a crucial role in it. Training of technical manpower, transfer of research reactors, building of research reactors, production and use of radio-isotopes in medicine, industry and agriculture, and uranium prospecting, mining and processing could be some of the aspects of nuclear development in which fruitful nuclear cooperation can take place among Third World nations. Particularly, the last mentioned aspect -- uranium production -- can be an area in which immediate economic gains can be obtained, especially for African countries producing uranium. As noted in Chapter II, West Germany, France and Japan have started looking towards African uranium resources, and the uranium production in Africa -- in Niger, Nigeria and Gabon -- is today controlled by the mining multinationals.

Kenneth Kaunda, President of Zambia, gave a call for cooperation between African countries to exploit their uranium resources. India and Argentina with their expertise in uranium production can help the African nations to break the stranglehold of the mining companies.

Nuclear cooperation among Third World could unite the Third World countries -- both parties and non-parties to the NPT -- to fight against the unjust and discriminatory nuclear non-proliferation regime. Increased coordination among these nations would also make it possible to bargain for better conditions of nuclear technology transfer from the developed countries and also to exploit the contradictions between the North American and West European nuclear policies.