

**NUCLEAR NON-PROLIFERATION WITH SPECIAL REFERENCE  
TO INDIA AND PAKISTAN (A META-GAME ANALYSIS)**

**Miss Jayashree A. Jayagopal**

**Submitted in Partial Fulfilment of the Require-  
ments for the Award of the M.phil Degree of the  
University, School of International Studies**

**New Delhi**

**1978**

# C O N T E N T S

	<u>Pages</u>
PREFACE	1-iii
CONCEPTUAL FRAMEWORK	
Scope of the Study; Definitions; Assumptions and Research Attitude; What this Study is not about.	1-6
SECTION - I: ATTITUDES TO ACD MEASURES	7-29
Specific Attitudes to Arms Control and Disarmament - India; Pakistan; China; Iran; Afghanistan.	
SECTION - II: POLICY AND OPERATIONAL INDICES	30-48
India's Nuclear Policy and Posture; Implica- tions of India's Explosion of 1974; Pakis- tan's Nuclear Posture and Policy; Pakistan's Atomic Energy Programme.	
SECTION - III: OBJECTIVE CHOICE OF PREFERENCE	49-66
Game Theory; Meta-game Theory; Format and Analysis; Particular Merits of the Analysis of Options Technique; Operation; Results of the General Analysis; Analyst's Note.	
CONCLUSION	67-78
APPENDICES	79-91
Full Text of NPT; NPT Review.	
Conference-List of Participants.	
BIBLIOGRAPHY	92-99

## PREFACE

This study on, "Nuclear Non-Proliferation with special reference to India and Pakistan", deviates from most analyses on nuclear non-proliferation in that, it is a Meta-game Analysis using the Analysis of Options Technique.

Meta-game theory is a recent development of the basic game theory and allows to establish a meta-game equilibrium by considering attitudes. Analysis of Options Technique is a refined version of the theory of meta-games.

Any Analysis of Options Technique begins with an account of the historical background and recent developments - both socio-economic and political, of the actors involved. This serves to explain the assumptions regarding the options preferred or not preferred, by the actors in the analysis. Thus, in sections I and II the attitudes of the actors are established with regard to Arms Control and Disarmament measures and particularly to the question of nuclear non-proliferation. Germaine to this kind of study therefore, is that no preferences are pre-empted by the analyst before the options are analyzed in section III. The nature of the contents of section I and II therefore must necessarily remain descriptive. Once the analysis of options has been undertaken and the equilibrium examined, the analyst is free to state personal opinions and indulge in a critical examination, which has been done under the heading of "Conclusions".

All this has been undertaken within the wider framework of systems approach, the methodology of which has been explicitly

stated in the conceptual framework.

I am extremely grateful to Prof. M.S. Rajan (Chairman, Centre for International Politics and Organization, School of International Studies, Jawaharlal Nehru University) for every encouragement and advice that he has given to me to concentrate on my research work.

My deepest debt is owed to Dr. T.T. Poulouse for allowing me unilateral freedom of thought and providing me with a thorough insight into disarmament studies. Without his substantial guidance, patience and encouragement, this study would never have been accomplished.

I wish to record my appreciation and grateful thanks to Dr. Ashok Kapur (University of Waterloo, Canada) for providing me with valuable criticism and helpful comments regarding the systems approach that has been used in the study.

My discussions with Dr. Robert Gallucci (US, ACDA, Washington, D.C.) were very helpful in dealing with the political aspects of nuclear proliferation.

I have also been benefitted from Dr. R.R. Subramaniam's deep knowledge of nuclear technology.

Finally, I wish to acknowledge my thanks to the Librarian and Staff of the Institute for Defence Studies and Analyses, New Delhi, for every help. I am also thankful to the Staff of the Indian Institute of Technology Library, New Delhi and the American Library, New Delhi for their kind assistance.

Ranjana Puri is particularly acknowledged for her assistance in the tedious task of proof-reading.

New Delhi

January 31, 1978

*Jayashree Jayagopal*  
Jayashree Jayagopal

## CONCEPTUAL FRAMEWORK

### Scope of the Study

This study on the dynamics of nuclear proliferation deals with India and Pakistan in relation to some very specific issues, that constitute the focus of investigation. These issues consist of three categories of problems. These are:

1) attempts to establish a pattern of regional and individual attitudes to the notion of arms control and disarmament measures and specifically to the Non-Proliferation Treaty (NPT) which came into force on March 5, 1970;

2) Policy and Operational issues of each nation state in order to establish certain objective indices that determine the nuclear proliferation curve; and

3) an objective analysis using the indices outlined and a system of options (a metagame) and preferences, to determine the nuclear proliferation configuration based on regional necessities and policy decisions.

### Definitions, Assumptions and Research Attitude

It is necessary to establish certain definitions, assumptions and attitudes before proceeding with any analysis of this kind.

The basic assumption underlying this analysis is the "International System" which is taken to mean the existence of sovereign nation-states engaged in systematic political relations. Thus the International System for our purpose consists of several participating actors-nation-states which are linked together by

political relationships. The postulation of specifically 'political' relationships as characteristic of the international system is admittedly rather arbitrary since relations between nations also include a whole set of political, social and economic interactions, with numerous interconnections between these categories. The highlighting of the political relationship variable is done with the specific intention of delineating those actors who do not have any significant political relationships and are within the boundaries of the system. Thus the boundaries of the system must be fixed and identify the actors within the system. This brings up the question of equilibrium and stability in the international system.

Equilibrium in an International System is best defined in terms of the relative power positions of nations, or the absence of major conflicts. Whenever any such arbitrarily chosen variable stays within arbitrarily set limits for an arbitrary length of time after it has been subjected to certain disturbing forces, the system is said to be in equilibrium. The stability of its equilibrium depends on the system's ability to either maintain itself by shifting to new states of equilibrium. The adjustment mechanism is the means by which the International System attempts to maintain the stability of its equilibrium.

Thus in an International System and specifically in the one being used in this analysis, there are two possible alternatives of maintaining stability. The simpler of the two is the direct method which requires adjustments of the individual capabilities of the actors in the system, principally by changing

their armament levels to establish satisfactory equilibrium. The other method is the adjustment of alliance-patterns among the various actors within the system, including the neutralization of some actors, to enable a satisfactory equilibrium in the system in the event of a conflict. 'System-rules' that regulate the relationships within the International System and problematic features have also to be defined. All these have been summed up in a diagramatic form<sup>1</sup> (see chart 1.1).

Preferences may be regarded as the objectives or goals of a nation's foreign policy. The actual set of preferences may be arrived at by several methods of aggregation. The actors in this analysis make their decisions taking into account domestic and extra-domestic factors that appear relevant and important. It is assumed that these decisions and preference-choices are made by single determinate actors. For the purpose of this analysis the Analysis of Options Technique has been specifically used, since in this technique the assumptions are minimal.

---

1 Morton Kaplan, "Variants on Six Models of the International System" in Rosenau, ed., International Politics and Foreign Policy (Free Press, N.Y., 1969), pp. 291-303. No specific model of Kaplan's has been adhered to in this analysis.

Kaplan delineates six types of system.

An attempt has been made at relating the concept of the system to existing empirical reality thus causing the conceptualization to become specific situation-oriented. This point is also made by Knorr and Verba, eds., The International System: Theoretical Essays (Princeton University Press, 1961), pp. 6-24.

Basically, the existence of discontinuities has been a guiding factor in deciding this definition. This has also been referred to by Oran Young, "Discontinuities in the International System" in Rosenau, ed., International Politics and Foreign Policy, op. cit., pp. 336-45.



**CHART 1.1.**

**SYSTEM CHART.**

	Actors	System-Boundaries	Policy flows
<u>Principal or 1st Dimensional</u>	INDIA PAKISTAN	UPTO Iran in the Middle East and China in the East encompassing the regions of Afghanistan, Pakistan and India	A certain amount of conflict is tolerated by the system and keeps it in dynamic equilibrium. Every actor respects the territorial sovereignty of the others.
<u>IIInd Dimensional or Secondary</u>	CHINA AFGHANISTAN IRAN		

**SYSTEM RULES**

**PROBLEMATIC FEATURES**

- |   |   |
|---|---|
| (i) Pakistan's territorial integrity is not questioned by New Delhi.                      | (i) China <u>has</u> questioned the territorial rights and integrity of India.  |
| (ii) India's territorial integrity is not questioned by Rawalpindi.                       | (ii) Pakistan <u>has</u> questioned the territorial rights and integrity of India (Kashmir issue, 1971 war).  |
| (iii) The existence of Kashmir as the territory of India is not questioned by Rawalpindi. | (iii) Afghanistan and Baluchistan are causing problems for Pakistan through political disturbances.   |
| (iv) Both India and Pakistan can indulge in propaganda.                                   | (iv) Indian perception of Pakistan's defence needs do not match with Pakistan's own perceptions.  |
| (v) Iran can provide security to Pakistan against India.                                  | (v) Indian perception of Pakistan's attitude towards disarmament measures and nuclear weapons use is contrary to the universal projection of these by Pakistan. |
| (vi) China can provide security to Pakistan against India.                                |   |
| (vii) China will not question the territorial integrity and rights of India.              |   |

What This Study is not About

First of all, it is not the intention of this study to make any indepth examination of arms control measures, referred to as ACD measures, or to go into the technicalities of the various ACD measures. However, the attempt is to establish a regional pattern of attitudes towards the concept of ACD measures and to highlight peculiar actor attitudes.

Secondly, this analysis does not attempt to undertake a study of the strategic-conventional-military strengths and capabilities of the actors in the system under scrutiny. On the other<sup>2</sup> hand, a very positive attempt is made to discern the real or core<sup>3</sup> attitudes of the 'specific actors' a particular and to comprehend the economic, political and social environment of the International System that may have a direct correlation to the 'specific actors' going nuclear vis-a-vis weapon possession.

Thirdly, this analysis is not concerned with the technicalities of general systems theory, it side-steps this issue all together. Therefore, only the very basic assumptions of a system, actors, boundaries, stability and equilibrium have been borrowed since further forays into the conceptual categories, models and definitions would, besides confusing the main issue at hand would also go beyond the purview of this study.

Finally, for the focus of this study will be more on

---

2 'Real or Core' denote the genuine attitudes. These are differentiated from universally acknowledged attitudes.

3 'Specific actors' term used to refer to India and Pakistan.

nuclear disarmament than on arms control because in conventional treatment in arms control studies, the possession and even a restrained arms race is invariably the outcome. This misplaced emphasis needs to be corrected in order to register any tangible progress of the present nuclear stalemate. The idea is of course not to eliminate conflict per se, but rather to markedly reduce the possibilities that nations may attempt to resolve conflicts by force or violence. This of course, does not preclude the possibility of eliminating or resolving some conflicts.

Thus, while this study aims at the development of ideas, the coherency of these ideas rests upon an objective analysis based on the development of a model of preference choices - using the Analysis of Options technique, where the assumptions are derived from the coherent attitudinal configuration that is perceived in Section I besides being substantiated by the indices established in part II. The final analysis and concluding statements are not intended to be all conclusive and sealing the debate, instead they are meant to provide objectivity instead of mere rhetoric and conjectures.

Such criteria as international security, ecological disturbances and social and economic changes will be discussed in the study. No attempt will be made to identify them as major problematic features, instead they will be considered as fall-out effects.

Finally, it becomes imperative to add that utmost care has been taken to avoid repetition and unnecessary rhetoric. A comprehensive bibliography is also given.

# CHART 12: TENSION & ATTITUDINAL PERCEPTIONS

COUNTRIES	IRAN	AFGHANISTAN	PAKISTAN	INDIA	CHINA
IRAN		NOT FRIENDLY	VERY FRIENDLY, FEELINGS OF MUSLIM BROTHERHOOD	CORDIAL	NOT HOSTILE
AFGHANISTAN	NOT FRIENDLY, SO FAR NO SERIOUS HOSTILITIES HAVE DEVELOPED		NOT FRIENDLY	VERY FRIENDLY	NOT HOSTILE
PAKISTAN	VERY FRIENDLY	NOT FRIENDLY, FEARS AFGHANS MIGHT AID BALUCHISTAN IN THEIR EFFORTS TO CREATE INDEPENDENT STATE		1. PAK. SUSPICIOUS OF INDIA'S NUCLEAR INTENTION AFTER PNE OF 1974 2. REJECTED INDIAN OFFER OF TECHNICAL HELP FOR. PNE DEVELOPMENT 3. PAK. HAS NOT ACCEPTED INDIA'S OFFER OF A NO WAR PACT	VERY FRIENDLY. HAS ACCEPTED TECHNICAL ATOMIC ENERGY ASSISTANCE FROM THE CHINESE. ITS A POSSIBILITY THAT CHINA IS CONSIDERED AN ALLY
INDIA	INDIA HAS MAINTAINED CORDIAL RELATIONS SO FAR	CORDIAL, GOOD TRADE RELATIONS	1. INDIA OFFERED A NO WAR PACT. 2. OFFERED TECHNICAL ASSISTANCE TO DEVELOP PNE IN PAKISTAN. 3. DOES NOT CONSIDER PAKISTAN A MAJOR THREAT POTENTIAL		INDIA WARY OF CHINA AFTER THE 1961 & 65 WARS. SUSPECTS A VERY STRONG SINO INTERFERENCE AS SOURCE OF ITS PROBLEMS IN NAGALAND & MIZORAM
CHINA	NOT HOSTILE	NOT HOSTILE	VERY FRIENDLY. ASSISTS IN NUCLEAR PROGRAM OF PAK. CHINESE PLAN OF USING PAK AS A PROXY STATE TO GAIN A POWER HOLDING IN S. ASIA PLAUSIBLE	NOT FRIENDLY VERY HOSTILE IN THE PAST RELATIONS TO BE THAWING HISTORY OF AGGRESSIONS ON INDIA 1962 & 1965 RE BORDER ISSUES CHINA RESENTS INDIA'S HOSPITALITY TO DALAI LAMA OF TIBET	

FIG. 1.

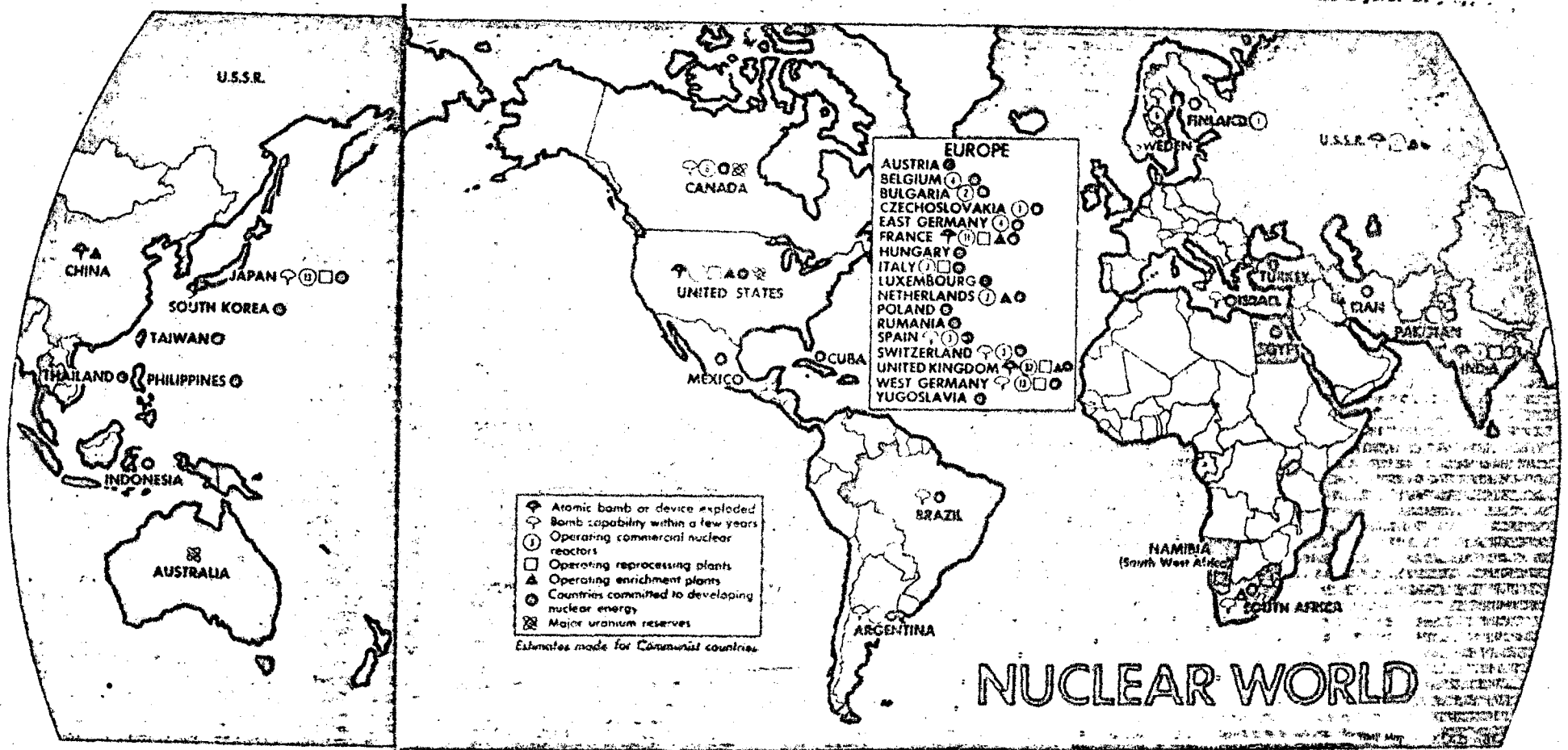


FIG. 2.1.

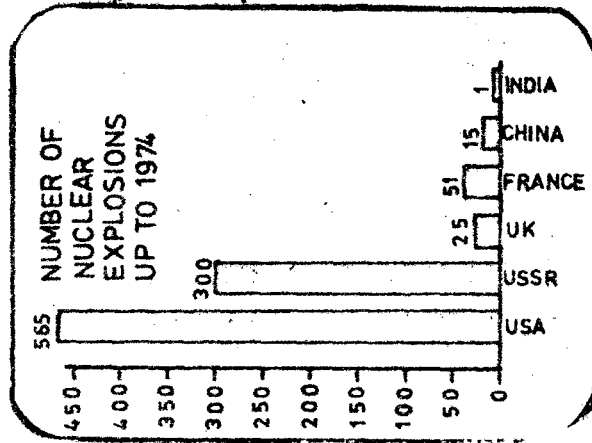
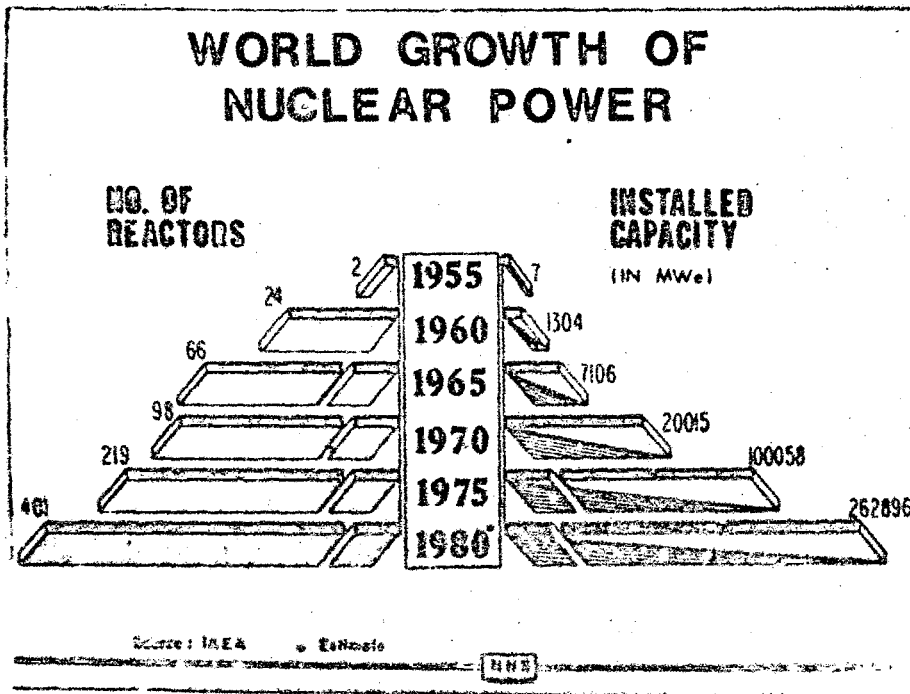


FIG. 2.2.



## Section I

### ATTITUDES TO ACD MEASURES

Inherent in the research attitudes is the development of a methodology to explain the dynamics of nuclear proliferation with special reference to the 'specific actors'. The first stage of the analysis is thus to sift some general patterns of factors that influence or inhibit nuclear weapons procurement, then to discuss the peculiar country attitudes that need to be considered.

"The aims of arms control and disarmament policies are peace and increased security through agreed limitations and reductions of armaments - measures that will reduce the danger of war, or lessen its destructiveness if efforts to avert war fail".<sup>4</sup>

Most ACD proposals that have been more than reverent hopes have been concerned with the Soviet-Western arms race, involving nuclear weapons (see fig. 1 & 2). It is widely held that nuclear warfare on a total war basis is intolerable and also a very possible event. Kahn sums up for several others when he says: "nuclear war may seem unlikely, indeed unthinkable to many people - it is not impossible".<sup>5</sup>

It is also generally agreed that there is danger of a limited war escalating to nuclear total war.<sup>6</sup> It has become amply

---

4 Arms Control and Disarmament Agency (ACDA) (Washington, D.C.), 15th Annual Report to the Congress, Publication 88, July 29, 1976, p. 4.

5 Herman Kahn, Thinking about the Unthinkable (London, Weidenfeld & Nicholas, 1962), p. 253.

6 Ibid.

clear that the threat of a nuclear war would not necessarily bring about a complete and universal abandonment of war, nor would it reduce the possibility of engaging in small-scale conflicts and power politics.<sup>7</sup> The very existential fact that the incidence of local wars is on the increase specially in the 'Third World', more than proves the point.

Kahn describes in a fine expose how nuclear war might come about in four categories.

(1) Inadvertent war - which might occur unintentionally as a result of mechanical or human error, false alarm, self-fulfilling prophecy or unauthorized behaviour. He believes that an advertent war may become a more dangerous possibility in the not too distant future.

(2) War by miscalculation: Nearly as worrisome as the possibility of an inadvertent war is this more or less premediated war which might come as a result of a decision makers' miscalculation, or failure to think adequately through the consequences of his action. Kahn uses terms like "committal strategy" and "rationality of irrationality", strategies where he designates the 'Game of Chicken' as a rationality of irrationality strategy and points out the possibility of war as a result of playing chicken once too often. He also talks about an "escalation ladder" where a limited move may appear safe but may set in motion a disastrous sequence of decisions and actions.

---

7 Aron Raymond, "The Evolution of Modern Strategic Thought", Adelphi Papers, 54 (February 1969), pp. 1-17. IISS-London.



(3) War by Calculation: Where war arises at least partly from deliberate calculation in the process of escalation. There are many situations in which this can occur, e.g. an external or internal crisis getting out of hand especially one deliberately aggravated by the opponent or merely by his existence.

(4) Catalytic War: It involves the notion that some third party nation might for its own reasons deliberately start a war between two major powers. The risk of destruction would be so great for the triggering power if discovered as to believe that any nation would take such a change.<sup>8</sup> This idea is also enlarged upon by Amelia Leiss, Geoffrey Kemp, John Hoagland, Jacob Refson and Harold Fisher.<sup>9</sup> To a certain extent these armed conflicts can be complicated by the involvement of foreign powers.<sup>10</sup> In fact, there has been no political war since 1963 without external participation or intervention.<sup>11</sup> The period from 1964 to 1975 was frequently faced with the military threats and the most dramatic of these occurred when the U.S. forces were placed on alert during the Yom Kippur War to stop Soviet military intervention.

---

8 H. Kahn, Thinking about the Unthinkable, n. 5.

9 Arms Control and Local Conflict, vol. III, M.I.T. Centre for International Studies, Arms Control Project, 1970.

10 For a comprehensive list see, Klaus Knorr, "On the International Uses of Military Force in the Contemporary World", Orbis, Spring 1977, p. 70.

11 This view is shared by Kende, Istvan, "Twenty-five Years of Local War", Journal of Peace Research, 8, 1971, pp. 5-22.

The object in limited wars is to gain one's political ambition by using military power if necessary, keeping the conflict short of a general nuclear exchange but nevertheless always manipulating the risks of escalation in order to elicit concessions from the opponent. It is this threat of escalation, so frequently and often effectively used to deter limited action that presents a serious problem for the arms controllers and most ACD policies and treaty.

If it not really necessary to ascertain if all these queries and doubts have been positively proved. More important is the fact that these views are widely held and have caused many governments to advocate controls that would curb the nuclear arms race, inhibit the possibilities of local or limited conflicts and reduce the event of escalation.

Thus, given this background there is every reason for countries to adopt a favourable attitude towards nuclear arms control and other measures of nuclear disarmament. This becomes all the more relevant to a country which does not possess nuclear weapons now and does not envisage the possibility of possessing them in the foreseeable future. In such a situation, the importance of conventional weaponry would become crucial for the present <sup>12</sup> NNWS. Consequently, past pronouncements in favour of arms control and nuclear weapons prohibition should be considered more objectively and not as conclusive attitudes of the nations making these statements.

---

<sup>12</sup> Refers to Non-Nuclear Weapon States.

Several attempts, bilateral and multilateral have been made to bring about nuclear disarmament. Although partial, some notable progress has already been achieved. <sup>13</sup> For the last quarter of a century or more since the end of World War II, the biggest danger of nuclear war grew out of the confrontations between the U.S.S.R. and the U.S.A. So efforts were directed to that problem and to diminishing and trying to control that confrontation. Because of the events of the last few years (SALT I & II) the confrontation has been abated but not been solved.

Ever since the atomic bombing of Hiroshima and Nagasaki the possibility of increased atomic holocaust had been assuming importance in world affairs. After the Hiroshima incident, Prime Minister Attlee in 1945, asked the U.S. for a clarification of the Anglo-American nuclear weapons relationship, adding that Britain should be treated as a party to all future development and knowhow as also of the past developments in the field. This was reflected by President Truman who finalized this with the passing of the Atomic Energy Act of 1946 also known as the McMahon Act, which prohibits the transfer of nuclear weapons information or materials to any nation.

The British were taken aback by the American attitude. This coupled with the British penchant for supremacy led to the announcement by Premier Attlee on October 29, 1945 to establish

---

13      PTBT, NPT and So On.

a research centre to examine the military uses of atomic energy.

At about this time the rationale for Britain developing nuclear weapons secured to Centre upon the possible Soviet threat to the British Isles and Western Europe, and possibly to strengthen Britain's relationship with the USA.

Though as early as 1954 there was sufficient scientific knowledge available for France to develop nuclear weapons it was not until February 13, 1960 that the first French explosion took place. The delay was partly due to the post-war reconstruction in France, together with the lack of a clear-cut objective policy in the French Government's decision making process during the 4th Republic. Super power rivalry combined with the US domination of NATO were instrumental to the French decision to go nuclear.

This brings us to East Europe. Russia wasted little time after the American nuclear explosion and in August 1949 the Soviets detonated their first nuclear device. The Soviets believed that they needed nuclear weapons to protect the communism citadel and it was necessary to sustain the U.S.S.R. as a country particularly encircled by hostile capitalistic leader of the

---

14 The Russians launched their nuclear programme in 1942. Tass, December 7, 1971 stated "The uncontrolled chain reaction and the explosive reaction has been recognized theoretically possible by the time of the outbreak of the Great Patriotic War. However, the Nazi attack had prevented the idea of Soviet atomic physicists from being put into practice for many years".

15 Hewlett and Anderson, The New World: 1939-1946, vol. I, p. 336. Pennsylvania State University Press, 1962. A very objective treatment of the American attitude towards the French is given by the authors.

16  
world. They also aided and encouraged China to develop nuclear technology. However, due to the subsequent Sino-Soviet chism and ideological polemics the Chinese began to develop indigenously nuclear weapon technology without any further assistance from the Soviets.

The first American proposal for controlling nuclear weapons was presented by Bernard M. Baruch, Chairman of the U.S. Delegation to the Commission, on June 14, 1946 and came to be called the Baruch Plan. It sought international agreement to establish international control of nuclear technology both for peaceful and military uses. It called for direct international ownership and supervision of the production of nuclear materials, and proposed a continuing system of inspection to guard against the illicit production and stockpiling of nuclear weapons. Though endorsed by a large majority of U.N. members, the plan floundered on the opposition of the Soviet Union. The Soviet Government objected to the extent of its provisions on inspection and control, and Soviet counter-proposals were regarded by the United States and other nations as wholly inadequate for verification. The Soviets also objecting to entrusting the Americans with the nuclear weapons till such time when international control was established.

Thus an impasse was reached which worsened further when President Eisenhower advanced an 'open skies' plan at the Geneva

---

16 This idea can be found in D.F. Fleming, The Cold War and Its Origins (Golden, City, Doubleday & Co., 1961), vols. I and II.

Summit Conference in July 1955, proposing that both countries (US & USSR) make available to each other facilities for aerial reconnaissance and exchange blueprints of their respective military installations. The Russians rose in protest and decried the suggestion as "nothing but a bald espionage plot". The disarmament negotiations since then ended in stalemate because of the mad momentum of the nuclear arms race between the US and USSR until the super powers hit upon the idea of arms control as a turning point from nuclear confrontation towards Nuclear Non-Proliferation.

On October 17, 1958, Ireland submitted a draft resolution to the U.N. General Assembly. The "Irish Proposal" called for immediate action against nuclear proliferation, in order to curb the accelerating spread of nuclear weapons.<sup>17</sup>

Thus from 1959 to 1961, the U.N. General Assembly considered the 'Irish Proposal' seriously paved the way for future United Nations action on nuclear non-proliferation measures.

On December 4, 1961, Resolution 1665 (XVI) was passed requesting all nuclear and non-nuclear weapon states to agree to an international agreement containing provisions under which nuclear states would refrain from transferring technical information and other details to NNWS. The NNWS were prohibited from

---

17      Agenda item 64, of the U.N. General Assembly, October 17, 1958. An additional Swedish proposal for curbing the dispersal of nuclear weapons was also put before the General Assembly. 62 answers were elicited and the consensus (though there was a great deal of divergence in individual opinions) was that any such undertaking should involve nuclear powers too.

manufacturing or acquiring such weapons.

The Eighteen Nation Disarmament Committee (ENDC) was set up by the U.N. in December 1961. The Committee members were Brazil, Canada, Bulgaria, India, Burma, Mexico, U.K., U.S.A., Ethiopia, Italy, Poland, Egypt, Nigeria, Czechoslovakia, U.S.S.R., Romania, Sweden and France. The ENDC was called upon to set out the main principles for a treaty to curb the proliferation of nuclear weapons.

Among those particularly active in the negotiations were eight non-aligned nations who were also non-nuclear weapon states. These were, India, Mexico, Sweden, Brazil, Nigeria, Ethiopia, Burma and Egypt.

The Nuclear Non-Proliferation Treaty (NPT) approved by the U.N. General Assembly on June 12, 1968<sup>18</sup> was opened to signature on July 1, 1968. It entered into force on March 5, 1970. On that day it had been, in accordance with Article 9 of the treaty ratified by the 3 states whose governments were appointed depositories (USA, UK and the Soviet Union) and by more than 40 other signatories.<sup>19</sup> On December 31, 1976 the number of parties to the treaty stood at a count of 101. On this date the IAEA had entered into 45 safeguard agreements.

However, those countries which have not subscribed to the

---

18 Resolution 2373 (XXII) in which the Assembly "Welcomes the Treaty", U.N. General Assembly, 1968.

19 See Appendix I for the draft of NPT and list of countries who are signatories. Appendix II for a list of countries vis-a-vis their status in regard to the NPT and the Review Conference of 1975.

treaty at all, are of still greater importance. In addition to India and 2 nuclear-weapon states (China and France), they include threshold powers such as Brazil, Argentina, India, Pakistan, Israel, South Africa and Spain and other NNWS, all of which still remain outside the NPT framework.

The criticism of the NPT by non-signatories and by some which have signed but not ratified it was mainly about the discriminatory character of the Treaty by which the nuclear have-nots will be deprived of their nuclear option, while the nuclear haves will have no corresponding obligations imposing any restraints on possessing or producing nuclear weapons.

The Chinese characterized the NPT as a "gigantic fraud" perpetrated by the two super powers in order to sustain their nuclear hegemony. <sup>20</sup> Other countries have been less sweeping in their condemnations, concentrating instead on assertions that the treaty discriminates in favour of strategic elites of the present international system, by failing to place any clear obligation upon them to limit or reduce their own nuclear arsenals. The French representative, while reiterating his government's adherence to the principle of non-proliferation, voiced the view that the NPT, in distinguishing and thus sanctioning a limited group of nations, uniquely entitled them to possess nuclear weapons. A more subdued criticism is that, whatever be the treaty's abstract quality, it fails to balance the central prohibition of

---

20 Cf. the speech by the Chinese representative during the UN General Assembly consideration of the IAEA, Annual Report, November 1, 1972.



'horizontal proliferation' with any effective check on 'vertical proliferation' by the nuclear weapon states themselves.

The Indian Defence Minister, in March 1970, summarized the charge in forthright terms:

We can never agree to sign a non-proliferation treaty...which does not take note of vertical proliferation and which does not take us even a step further towards stopping the mad race of increasing the nuclear arsenal of the super powers and those who belong to the nuclear club. (21)

Clearly, charges of strategic discrimination have thus originated from a general concept of equality and that the obligations imposed on parties to such a consensual agreement should be universal. On the other hand, they imply an assumption about international politics namely that the possession or non-possession of nuclear weapons represents a component, or at least a symbol, of the relative status of nations; in other words it is status quo-oriented.

It is one of the paradoxes and problems of the NPT that its designers, unable or unwilling to contemplate the logical alternatives of nuclear disarmament or a world of many nuclear powers, have been driven to formalise the distinctive status of nuclear weapon states as part of an effort to dissuade others from joining that group. (22)

The problem grows when the NNWS find reason to believe that, in being relegated to a lesser status, they have been

---

21 Answer to a question in the Lok Sabha by the Defence Minister, Swaran Singh, March 11, 1970 (Lok Sabha, Parliamentary Debates, 4th series, vol. 37, no. 15, col. 330).

22 Ian Smart, "Non-Proliferation Treaty: Status and Prospects in NPT: Paradoxes and Problems (Washington, D.C.: Carnegie Endowment for International Peace Arms Control Association, 1975), ed., Anne Marks, p. 22.

constrained to accept the more serious obligations than the nuclear haves.

India regarded a universal test-ban treaty as an essential prerequisite of nuclear disarmament<sup>23</sup> and was in the throes of this attitude when the NPT came into effect on March 5, 1970. India refused to sign the NPT in its final form. India's attitude was firmly one of non-discrimination, as felt that there was an inherent pro-nuclear haves bias in the NPT; nevertheless maintaining its policy of non-alignment and anti-bomb philosophy, the Indian representative Azim Hussain made the following statement at the ENDC on August 13, 1968:<sup>24</sup>

...as regards collateral measures of disarmament the highest priority must naturally go to measures in the field of nuclear disarmament. Among these, the most important as the Indian delegation has repeatedly stressed in the past, is a cut-off in the production of fissionable material for weapons purposes. This would be the most significant step towards a complete stoppage of the production of nuclear weapons. There could be no justification whatsoever for any addition to the existing stockpiles of nuclear weapons, which already have the capacity of killing the world several times over. As has been rightly observed by certain other delegates also, the difficulty of a verification of a cut-off in the production of fissionable materials for weapons purposes could no longer be cited as a reason for not reaching an agreement on this measure, since an agreement on control already exists and the

---

23 For a detailed account of speeches by Indian Statesmen and delegates see, J.P. Jain, Nuclear India, vol. II, (Delhi, Radiant Publishers, 1974); G.G. Mirchandani, India Nuclear Dilemma (Delhi, Popular Book Service, 1968); and for a narrative expose see, J.P. Jain, India and Disarmament: Nehru Era (Delhi, Radiant Publishers, 1974).

24 ENDC Document, ENDC/Pv. 389, pp. 5 and 8, 1968.

obligations of the nuclear-weapon states in respect of inspections by the IAEA could be made the same as those states not having nuclear weapons should, therefore, be concluded as early as possible.... When we speak, of a comprehensive test ban treaty, we must inevitably speak of nuclear explosions for peaceful purposes. Whether the benefits from such explosions in the form of practical applications are to become available in the near future or in the distant future, when we are legislating for the international community on a long term basis, some provisions would have to be made for nuclear explosions for peaceful purposes. This question is logically and directly linked to that of a comprehensive list ban treaty and should be considered in conjunction with a comprehensive test ban and not separately from it. In the first instance, a total prohibition in regard to nuclear explosions must apply to all states, nuclear as well as non-nuclear. An international regime should then be established in respect of nuclear explosions for peaceful purposes. The development of the technology of nuclear excavation projects must be sought not by way of a modification of the Moscow Test Ban Treaty but in the context of a comprehensive test ban treaty and through a separately negotiated agreement which should be part of the international regime for peaceful nuclear explosion.

India's interest in all matters pertaining to disarmament does not need to be emphasized. It is well known that Jawaharlal  
 25  
 Nehru and India were responsible to a considerable extent for

---

25 India's attitude towards disarmament measures, nuclear weapons and foreign policy was rooted in Nehru's perceptions and crystallized under his directions and came to be traced to a period as early as 1947 when Nehru became the Nation's first Prime Minister and Minister of External Affairs. In 1954 when for the first time a Department of Atomic Energy was set up in India. Nehru became the nation's first Minister for Atomic Energy and till his death in 1964, Nehru used every opportunity to defame the bomb and to advocate the ban on the use of nuclear weapons. Thus till 1964 there was a general consensus in India even amongst the opposition parties that "Ban-the-bomb" philosophy was the most appropriate. The first

(Contd. on next page)

awakening mankind to the perils of nuclear weapon tests and use. The Indian initiative to decry nuclear weapons helped to shape the opinions of the Third World countries. India had actively participated in all discussions of the U.N. General Assembly on the need for the formation of an International Atomic Energy Agency. Speaking in the debate at the 9th session of the General Assembly on November 17, 1954 Krishna Menon stated that the peaceful uses of atomic energy was of great importance and it would create great changes in the economic and perhaps political relations of the world and held special import for India, which was a developing nation. He stated that India had made considerable progress in atomic research after the establishment of the Atomic Energy Commission in 1948. Menon, also pointed out that India had very large deposits of low grade uranium ore and considerably large deposits of thorium besides having the most advanced atomic energy programme in Asia. Menon thus made it known in very explicit terms that all the financial, scientific and technical resources were possessed by it and that India did not need any external assistance.

In August 1955, the First International Conference on Peaceful uses of Atomic Energy was held in Geneva and India's Homi J. Bhabha was elected President. H.J. Bhabha made very valid point before the U.N. General Assembly on October 12, 1955

---

Chinese nuclear test occurred on October 16, 1964. This more than the Sino-Indian conflict of 1962 stimulated critical awareness and substantial threat perception in Indian political circles and gave rise to the pro-bomb lobby.

when he said, "Even if, the widespread use of atomic energy for peaceful purposes raised political and military problems, there would be no options but to solve these problems".<sup>26</sup>

Finally after several protracted discussions and negotiations, revisions of drafts submitted by the US and U.K. and incorporating numerous suggestions and several amendments made by the very energetic Indian delegation,<sup>27</sup> the final text of the International Atomic Energy Agency (IAEA) was adopted at a special conference during September-October 1954. After further protracted negotiations, the final text was approved by the Conference on the IAEA Statute on October 26, 1956 and the IAEA was firmly established on July 29, 1957 after 26 countries including India had ratified the Statute. India made two very crucial observations at the time regarding the necessity of improving the safeguards provided by the IAEA<sup>28</sup> and the sale of uranium and other materials under a system of safeguards.

It is understandable, therefore, that the Indian refusal

---

26 UN Document A/C.I/SR. 760, pp. 19-21, 1955.

27 India was the only country from Asia and Africa in the 12-Nation Negotiating Group that was responsible for drafting of the Statute of the IAEA.

28 The IAEA was set up with the following objectives, "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 purposes". Statute of the IAEA signed on October 23, 1956. Documents of the IAEA, Austria, October 1965 (Reprinted).

to sign the NPT was not built on shifting sands. The Indian attitude had been very precise in all the ENDC meetings when the NPT was being negotiated and had continuously been making valid objections along with other non-nuclear countries.<sup>29</sup>

The Chinese were even more critical of the ENDC efforts to arrive at a more acceptable draft during 1967, and opined:

...the aim of the treaty remains the same, that is to deprive the non-nuclear nations which are under US-Soviet nuclear threat of their rights to develop nuclear weapons and to place some countries under the U.S. imperialist and Soviet revisionist nuclear umbrella so that US imperialism and Soviet revisionism may maintain their status as nuclear overlords. (30)

The Pakistani delegate summed up the fears of all non-nuclear powers when he said "that even if almost all the non-nuclear states signed and ratified the treaty, and all the near nuclear-weapon states did not, the main purpose of the treaty would be defeated".<sup>31</sup> Thus despite the interest shown by the Pakistan delegation at the U.N. General Assembly meetings during 1966 and the contribution of a proposal to the Political Committee of the U.N. General Assembly on October 20, 1966,<sup>32</sup> Pakistan

- 29 The Times (London), January 15, 1968 outlined the Indian and other non-nuclear countries' attitude.
- 30 Reported by New China News Agency, January 24, 1968 in Jen-min Jih-pao.
- 31 Documents on Disarmament 1968. ACDA, Washington, D.C.
- 32 The Pakistani proposal called for a conference of non-nuclear states to consider the security of non-nuclear states and the peaceful applications of nuclear energy. Resolution 21538 (XXI). The Conference met in Geneva in August-September 1968.

DISS  
327.17470954  
J334 Nu



TH104

TH-104



felt that the NPT was unjust and not acceptable.

Afghanistan was against nuclear proliferation and favoured an international convention to discuss this matter at the U.N. General Assembly on October 17, 1958.<sup>33</sup> Afghanistan however, became a signatory to the NPT, emphasizing all the time that it stood for world peace and true non-alignment. There was no consistent and vocal commitment however and sporadic speeches in ACD views were often interspersed with political turmoil till 1973 when President Daod came into power.

Disarmament efforts subsequent to the NPT proved to be impotent and achieved almost nothing.<sup>34</sup> Even the Partial Test Ban Treaty (PTBT) only encouraged the American-Russian arms race and encouraged proliferation of arms rather than decrease it.<sup>35</sup>

“It would not be unfair to say that during the sixties the super powers have colluded in presenting to the world a series of significant agreements, and that these have been turned into insignificant treaties at very considerable expense of international time and trouble and breath. Not only has no significant

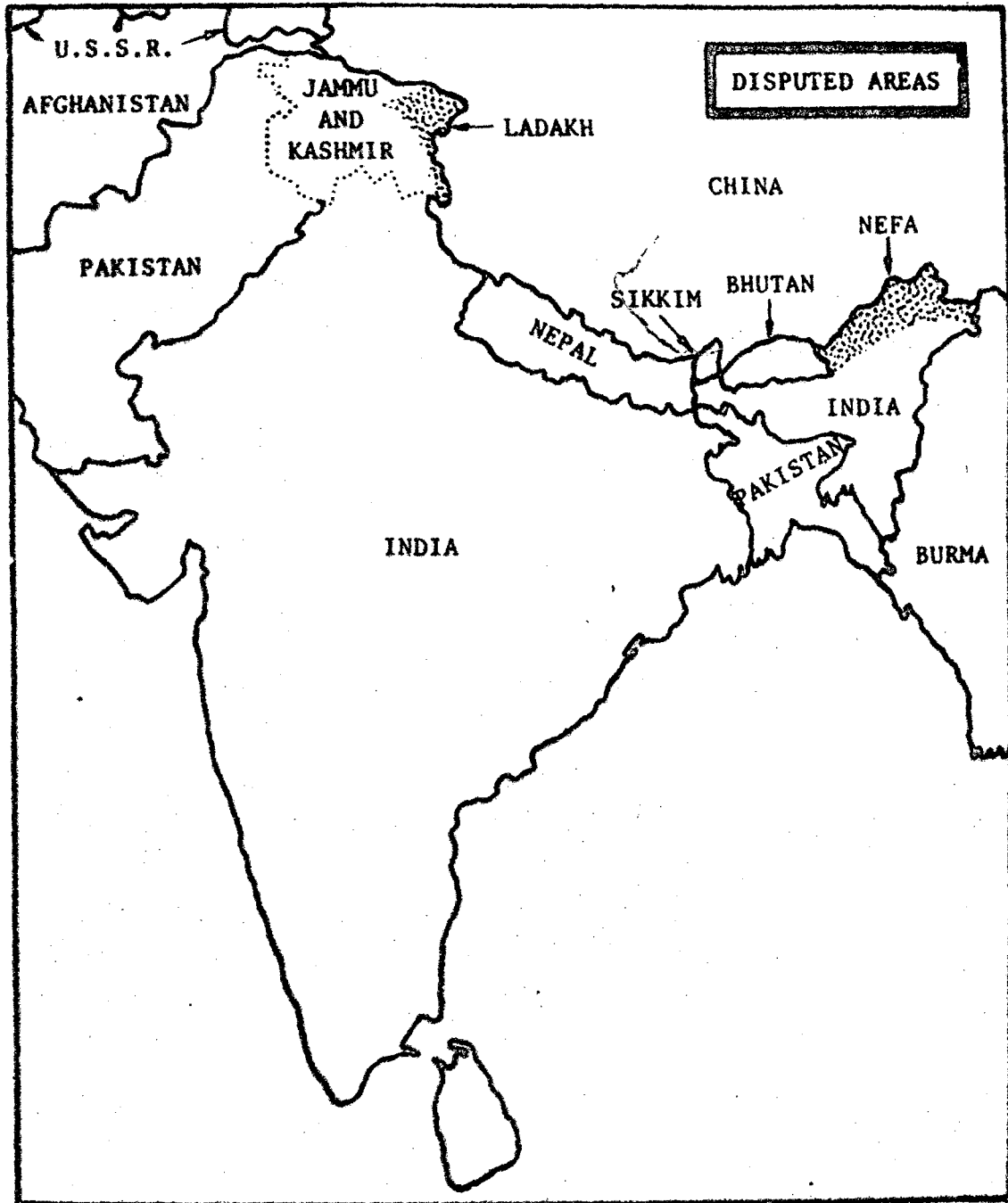
---

33 Elizabeth Young, A Farewell to Arms Control (U.K., Pelican Books, 1972), p. 85.

34 A brief note: (1) The Antarctic Treaty, entered into force June 23, 1961; (2) The Direct Communications Link between Moscow and Washington, September 30, 1971 at Washington; (3) The Partial Test Ban Treaty (PTBT) signed at Moscow by USSR, USA and the UK on August 5, 1963. This treaty banned nuclear weapon tests in the atmosphere, outer space and under water; (4) Space Treaty signed at Moscow, London and Washington, January 27, 1967.

35 This point is made by R.R. Neild, The Test Ban: SIPRI Research Report, October 1971. (STOCKHOLM).

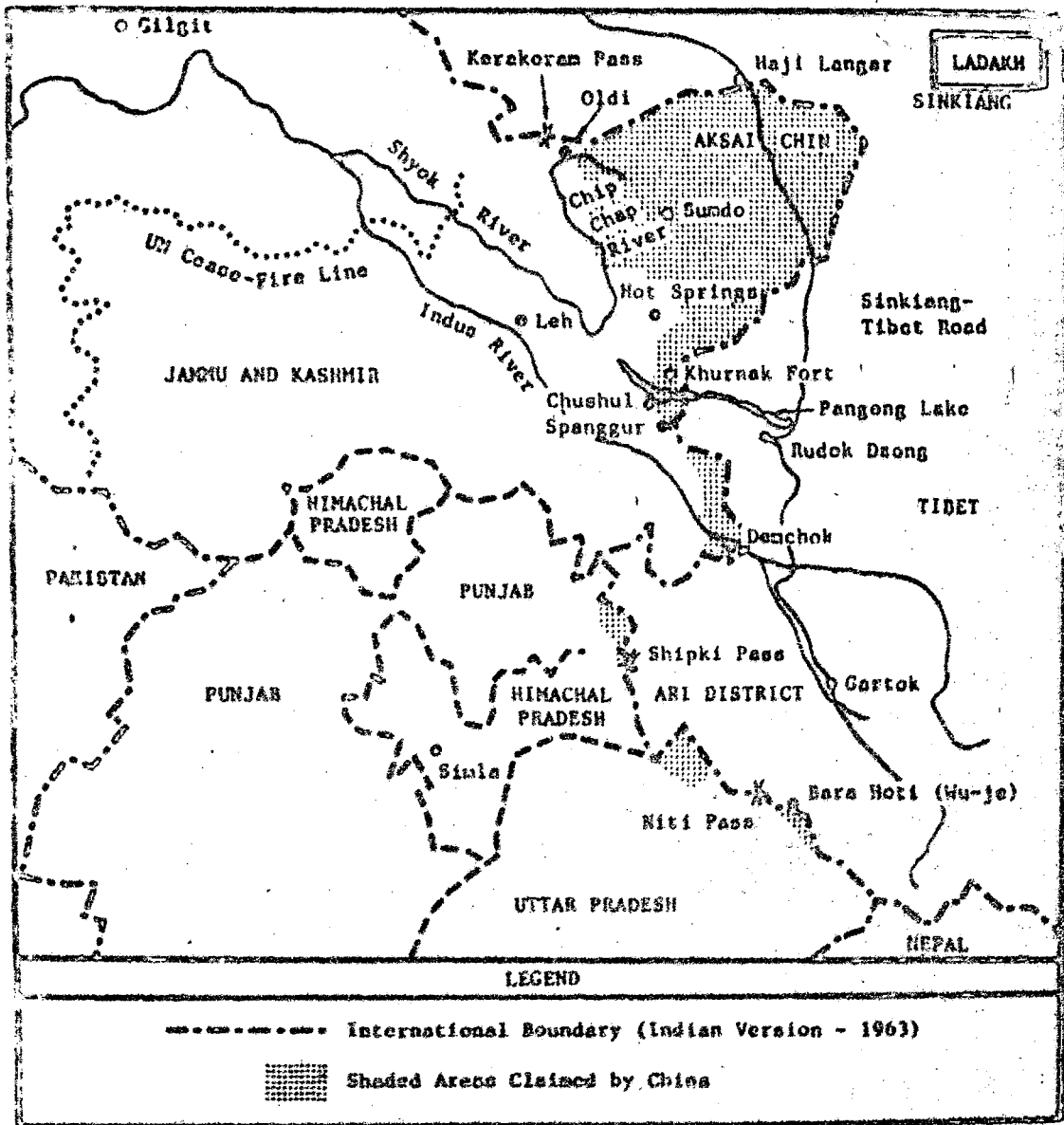
FIG. 3.



Adapted from U.S. Policy with Respect to Mainland China:  
Hearings Before the Committee on Foreign Relations  
(Washington, D.C., G.P.O., 1966).



FIG. 4.



Adapted from U.S. Policy with Respect to Mainland China: Hearings Before the Committee on Foreign Relations (Washington, D.C., G.P.O., 1964).

agreement been reached, but the central problem, which is how to substitute the security of certainty for the security of weapons, and on which the super powers disagree, has gone quite undiscussed.<sup>36</sup>

It would be of considerable use to construct an attitudinal chart vis-a-vis the possibility of a no war defence pact, restricting it to the universe defined earlier. This would establish the individual attitudes of the actors towards some cumulative ACD arrangements and towards each other. A convenient fall out of such a chart would be the possible perception of existing tensions between the actors. This will provide a convenient starting point for section II, besides effectively summing up the preceding presentation.

Specific Attitudes to Arms Control and Disarmament

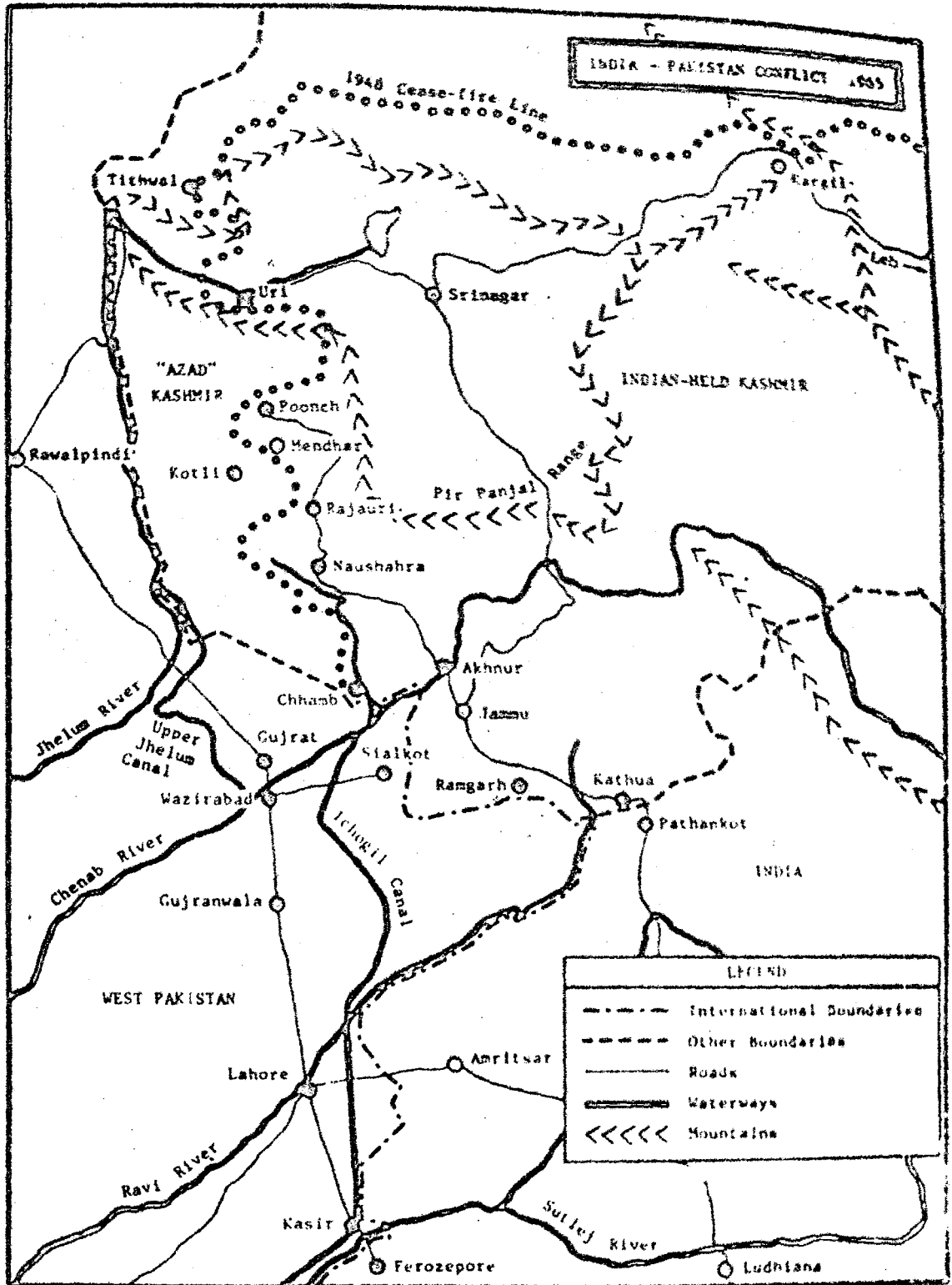
India: India's attempts to affect a non-proliferation agreement are well known. This has been the ultimate objective of India since independence. If ACD measures can meet the basic prerequisites - pursuit of non-alignment, non-production of nuclear weapons, and maintenance of national security, they may receive earnest consideration from India.

India's major conflict, potential and threat perception is still with Communist China (see fig. 3 and 4). The Chinese seizure of Tibet, subsequent confrontation in 1962 together with

---

36 Elizabeth Young, A Farewell to Arms Control, n. 33.

FIG. 5.



the continuing skirmishes on the vaguely defined borders of Ladakh and Northeast Frontier Agency, fear of a possible nuclear confrontation with China have created a strong source of tension for India. However, India has consistently stood by a good neighbourly policy of peace and unilateral renunciation of nuclear weapons despite a possible combined Sino-Pakistan confrontation (see fig. 5).

India has also offered a no-war pact<sup>37</sup> to Pakistan which has not been accepted by the Pakistanis so far.

### Pakistan

Pakistan's reactions to ACD measures must be viewed in the context of its perception of insecurity and possible aggression from Russia (should Russia seek Gwadar as a warm water port) and India (over Kashmir) and Afghanistan (over the creation of an independent Pakhtoonistan from the Pushtu minority in the two countries).

Pakistan's major external conflict is with India and concerns the region of Jammu and Kashmir. Pakistan believes that the adjacent Muslim territory should by its very nature, belong to it. Strategic reasons are also responsible in part for this belief. All the rivers that flow through Pakistan rise in the vale of Kashmir and Pakistan fears possible Indian diversion of the courses of these rivers because India controls the sources.

---

37 J.P. Anand, "India and Her Neighbours", Strategic Analysis (New Delhi), vol. 1, no. 7, October 1977, p. 5.

The fact that India and Pakistan have concluded an Indus Water agreement, in no way detracts from Pakistan's seemingly primordial fear of India.

Thus, unless India signs the NPT Pakistan will take no steps in that direction. Pakistan is insisting on a South Asian nuclear free zone in order to neutralize India's nuclear capability. She moved Resolutions in the U.N. in 1976 and 1977. However evidence suggests that it is concentrating on the explosion of a nuclear device, possibly to boost its prestige, as was the case with India.

### China

Communist China believes in the Maoist ideology that, universal and overall disarmament can be realized only after imperialism, capitalism, and all systems of exploitation have been eliminated. However, it also believes that complete and thorough prohibition of nuclear weapons can be achieved while imperialism still exists. The following statement of the Communist Chinese Government on July 31, 1963 made its attitude very clear:

(1) All countries, both nuclear and non-nuclear must declare that they shall prohibit and destroy all nuclear weapons;

(2) All countries shall dismantle all military bases, including nuclear bases, on foreign soil, and withdraw from abroad all nuclear weapons and their means of delivery they shall establish, inter alia, a nuclear-weapon free zone of the Asian and Pacific region, including the United States, the Soviet Union, China and Japan, they shall refrain from exporting and importing

in any form of nuclear weapons and technical data for their manufacture; they shall cease all nuclear tests, including underground nuclear tests.

(3) An International Conference shall be convened to discuss the question of the complete prohibition and through  
38  
destruction.

Peking considered that Socialist countries should always strive to be on the defensive against nuclear threats from the imperialists. Hence China should develop defensive nuclear weapons. The Chinese also expressed dissatisfaction with the nuclear test ban treaty and made known their suspicions of its alleged advantages to the imperialists. They refused to sign the NTBT.

On October 16, 1964 the Chinese exploded their first nuclear device and withdrew their long standing support for the creation of a nuclear free zone and changed her emphasis to no  
39  
first - use principle. The Chinese also became very determined to carry on with their nuclear programme. The Chinese also determined their foreign policy according to socialist needs which decried territorial aggrandizement as a tool of imperial coercion "Nor naturally will we tolerate other countries occupying an inch  
40  
of ours". The attitude is clearly a defensive posture and not

---

38 Peking Review, no. 31, 1963, p. 8.

39 Editorial, "New Starting Point for Strivings for Complete Ban on Nuclear Weapons", Jen-min Jih-pao, May 12, 1966. New China News Agency.

40 Peking Review, no. 29, 1962, p. 6. Obviously directed towards India and Taiwan.

likely to abate into passive acceptance of the super power dominance in disarmament negotiations.

### Iran

Though Iran is a signatory to the NPT the possibility of her becoming a nuclear weapon power is not entirely ruled out. Iran's nuclear ambitions are indeed very commendable. <sup>41</sup> Iran expects to have a capacity of 34,000 MWe of nuclear power by the year 1995. <sup>42</sup> Iran also has ambitious plans to acquire the requisite manpower by establishing by various technical training schemes externally as well as accepting external training in nuclear know-how.

Iran's interest in acquiring nuclear weapons seems to stem from a deep sense of territorial insecurity. Consequently the support of Pakistan's territorial integrity can be directly traced as a pay-off of the policy of maintaining a Pakistani buffer state would provide some deterrent to possible Soviet plans

---

41 Nuclear News, February 15, 1976, p. 55. Gives an account of Iran's nuclear energy ambitions which include agreements for the purchase of 2 nuclear reactors from West Germany of 1,200 MWe and 2 from France of 900 MWe and estimating a need of 1 reactor per year from 1980 onwards. Besides this negotiations have also been concluded with the USA for 8 more reactors and plans remain to acquire an indigenous plutonium reprocessing plant.

42 New York Times, January 4, 1975. Besides this the New York Times, January 6, 1975 and Economist, December 6, 1975 report that Iran has invested a considerable sum of money in a French sponsored Eurodif Enrichment Plant and an undertaking from South Africa to acquire access to South African uranium enrichment technology.

of encirclement.

"Iran has provided assistance to Pakistan during the 1965 and 1971 wars with India and has recently been supporting Pakistani efforts to control unrest in Baluchistan".<sup>43</sup>

The Shah's shifting foreign policy alignments are thus a classic symptom of a deep geopolitical insecurity. This can be noted in the lukewarm attitude now shown towards India as opposed to pre-Indian PNE attitude which was certainly far from lukewarm.

A possible nuclear weapons programme triggering factor could be the nuclearization of the middle-East. However the Iranian acquisition of nuclear weapon is closely linked with the Shah's ambitions of being counted as a "bargaining power". The value of nuclear weapons in this regard has been well demonstrated by the world's major nuclear powers and needs no further mention. Iranian foreign policy is obviously not one of non-alignment, rather it seems to be defence oriented as can be discerned from this statement made by the Shah of Iran, "it is not possible for us to be observers to another blow against the territorial integrity of Pakistan".<sup>44</sup>

### Afghanistan

President Daood has strongly reiterated Afghanistan's stand favouring world peace and non-alignment. In a T.V. interview at New Delhi on March 13, 1975 he expressed concern over Pakistan's

43 Lewis Dunn, India, Pakistan, Iran: A Nuclear Proliferating Chain, Hudson Institute Report, HI-2407, March 21, 1976.

44 Sepehr Zabih, "Iran Today", Current History, February 1974, p. 67.



undue suspicions regarding Afghanistan's relations with India and the U.S.S.R. which are very good. He stated that his country was in favour of establishing friendly ties with all its neighbours. He supported India regarding the establishment of a zone of peace in the Indian Ocean, and criticized developed nations for following balance of Power tactics and interfering in the internal affairs of less developed nations.

In a speech broadcast over Radio Afghanistan on July 17, 1973 he said:

From our national needs and aspirations it becomes clear that the attainment of our goals more than anything else is dependent on world peace, and no country can achieve its national wishes without peace. Since, we, more than any other country are in need of endeavours for the development of our country. Therefore, more than anyone else, we are desirous of peace and security in the world. The element which distinguishes the traditional non-aligned policy of Afghanistan, is its clarity and weakness, manifesting the independence of Afghanistan's national determination. (45)

He clarifies Afghanistan's geopolitical situation in very characteristic terms when he says, "Our relations with Pakistan, which is the only nation with whom we have a political difference over the Pashtunistan issue, which we have not been able to solve so far, will be based on our permanent efforts to find a solution to the Pashtunistan problem".<sup>46</sup>

Thus, Afghanistan's attitude towards ACD measures are positive and in favour of total disarmament as a step towards universal peace.

---

45 The Financial Times (London), July 18, 1973.

46 IDSA News Review on South Asia, August 1973.

FIG. 6.

*Nuclear-weapon proliferation*

India's nuclear research and power facilities



SOURCE: SIPRI YEARBOOK, 1975.

## Section II

### POLICY AND OPERATIONAL INDICES

47

#### India's Nuclear Policy and Posture

India's nuclear policy is closely tied to utilizing nuclear science and technology for the economic growth and development of the nation. The nation's approach to nuclear energy development is firmly built on the fact that "Atomic or more correctly nuclear, energy holds the promise of abundant power and plentiful water - the keys to industrial progress - as well as of more food, better health, greater industrial productivity. It is not surprising that the interest of the developing countries is rapidly increasing".<sup>48</sup>

India's problems of poverty and regional imbalances could be effectively tackled only with the development of nuclear energy besides developments in other fields. The need for nuclear energy for peaceful purposes in the development plans for India is indeed paramount. "It is today essential for economically supplying energy in large parts of the country and is moreover the only major supply on which we will need to fall back in perhaps less than 50 years time".<sup>49</sup>

---

47 This account is largely based on the Annual Reports of the Atomic Energy Commission, Government of India for period 1970 to 1976 and the Report of the Department of Atomic Energy for the year 1957-58. (SEE FIG. 6)

48 Ibid.

49 V.A. Sarabhai, Atomic Energy and Space Research: A Profile for the Decade 1970-80 (Atomic Energy Commission, Government of India, 1970).

Unlike Pakistan's large resources of coal and natural gas, India is not endowed with much of nature's bounties. However, India does have the world's largest thorium deposits and some uranium deposits (though not sufficient enough to cater to India's growing energy demands). Should the question of justification arise between these two countries, it is more precise to justify the Indian need for atomic energy more than Pakistan's need.

The fiscal allocation to the Atomic Energy Department for the period 1948-49 was Rs.300,000. Since then, the allotment has been constantly rising. The allotment for the period 1954-55 was Rs.8.2 million and for 1964-65 almost Rs.259 million. The allotment for the years 1966-67 reached an all-time high figure of Rs.707 million.

Between 1956 and 1961, three research reactors were set up. The first Indian reactor <sup>50</sup> Apsara was indigenously designed and built and became critical in 1956. The reactor has been used in the production of radio isotopes and for research in neutron physics, engineering and biology.

India's second reactor Cirus became critical in 1960. This reactor uses natural uranium as fuel and is heavy water moderated with a power capacity of 40 MW. This was set up with Canadian assistance and has contributed towards basic research in chemistry, neutron physics and reactor technology.

India's third reactor Zerlina was commissioned in 1961 and

---

50 This reactor uses enriched uranium and is classified as a light water moderated swimming pool type reactor.

was indigenously built. It is a heavy water moderated reactor / using natural uranium and is used for lattice investigations and new assemblies in reactor and nuclear technology. In 1962 Purnima was built and became critical in May 1972.

In 1967 the Atomic Energy Establishment at Trombay was renamed as the Bhabha Atomic Research Centre (BARC).<sup>51</sup> In 1967 almost 8,000 people were employed at BARC. The Centre has done commendable work since its inception.

India's first atomic power station was built with American assistance at Tarapur<sup>52</sup> and it uses enriched uranium as fuel. The other nuclear power stations at Ranapratab Sagar in Rajasthan<sup>53</sup> and Kalpakkam in Madras<sup>54</sup> uses natural uranium for fuel. Both Rajasthan and Madras have the CANDU type reactor which uses heavy water as moderator and also as coolant and enriched uranium / U 235 as fuel.

It was estimated that by 1980, India would have roughly 2,700 Megawatts of installed CANDU type reactors and an output of 900 kgs of plutonium annually. During the 1980s India expects to

- 
- 51 In memory of Dr Homi J. Bhabha pioneer and architect of India's Atomic Energy Programme, who expired in plane crash over Mont Blane on January 24, 1966.
- 52 Tarapur N. Power Station became operational on February 27, 1969 and generated 7,636 million units from October 1969 to March 1974.
- 53 Being built with Canadian assistance. The first unit became critical in August 1972. Raps I and II almost indigenous.
- 54 Kalpakkam is a 470 MWe power station: 20 per cent imported material; 80 per cent Indian material.

acquire one 400-500 MWe fast breeder reactor which will use the plutonium from the CANDU reactors as fuel. India's goals for the years 1980-2000 are ambitious and she expects to have about 4300 MWe of nuclear power, almost 30 per cent of the total installed capacity.

A uranium oxide plant has been built at Hyderabad in Andhra Pradesh and has an annual capacity of 250 tonnes. This is used as fuel for the Rajasthan and Madras power stations.

The Atomic Energy Commission has also contributed towards research in Agro-Industrial complexes: food irradiation centres and pesticide research are worth mentioning.

The Electronics division at BARC has produced almost all the electronic instruments needed for radio isotope research. The BARC also has a very intensive training programme and produces able scientists for work in the centre, after a 3 year training programme. In 1945 the Tata Institute of Fundamental Research was founded by Bhabha and TIFR has been collaborating with BARC in fundamental research in nuclear science and mathematics besides experiments on cosmic rays.

Besides all this, India has also actively participated in programmes of space research since 1961. The programme has been undertaken in collaboration with France and the USA and has investigated the dynamics of rocket launching. In 1965 the Thumba Station, the world's only land-based rocket launching, station had become freely available to all U.N. members under a sponsorship scheme by the UNO. India's first rocket, Rohini RH-75 was launched in November 1967. An arrangement for collaboration for

research in satellite communications technology has been concluded with NASA in the USA.

India has offered her nuclear know-how and training facilities to many countries including accepting assistance from some which include Afghanistan, the United Arab Republic, Australia, the U.K., the USSR, Sweden, France, Austria, Hungary, Germany, Belgium, Burma, Brazil, Canada, East Germany, Poland, Czechoslovakia, Spain, Italy, Iraq, Thailand, Japan, Philippines, West Germany, Yugoslavia, and the USA. India has also participated in all IAEA activities since its inception in 1957.

#### Implications of India's Explosion

India has consistently stated that acquiring nuclear weapons is not the goal of her nuclear energy development programme. This stand has been reiterated time and again since India began to participate in the disarmament conferences. India's decision is based on certain specific faiths and beliefs; and even a constantly growing threat from China has not caused India to change her defense options in favour of nuclear weapons. This philosophy however does not preclude developing a capability to produce nuclear weapons, particularly when this capability is a fall-out of a General atomic energy development programme. India's peaceful nuclear energy programme was far ahead of China when the latter exploded <sup>a bomb</sup> in 1964. Thus when India did explode her first

---

55 India, Lok Sabha Debates, December 14, 1964, cols. 4647-57.  
Statement by M.C. Chagla, Foreign Minister.

atomic device at Pokhoran on May 18, 1974, the reaction of the world's nuclear powers was indeed unexpected and hostile.

The reaction of the Canadian and US Governments' was mainly because India is not a signatory to the NPT. It is interesting to note that the USSR though a great protagonist of the NPT has not criticized India for her PNE of 1974. The Russian reaction was one of appreciation, that India had developed a research programme "striving to keep level with the world technology in the peaceful uses of nuclear explosion".<sup>56</sup>

India's PNE<sup>57</sup> cost her almost Rs.32 lakhs. Costs include digging of the 100 metre deep well at the site, instruments and necessary devices as well as the plutonium P.U. - 233 used for the experiment.<sup>58</sup> The Atomic Energy Commission of India spends 7 times as much money on nuclear research in agriculture and medicine alone according to Dr Sethna.<sup>59</sup>

In carrying out this underground test no international treaty or agreement had been violated.<sup>60</sup>

---

56 Times of India, May 19, 1974.

57 PNE technology is particularly relevant in the fields of mining and earth moving e.g. excavation work for a harbour using PNE methods are estimated at \$5 million as opposed to \$56 million using conventional methods.

58 Times of India, June 1, 1974.

59 Ibid.

60 Pakistan's Foreign Secretary, Agha Shahi stated to the CCD on May 23, 1974 that Pakistan was "deeply concerned over the emergence of a sixth nuclear power", as also that India had violated the PTBT of 1963 due to radioactive nuclear venting, and the formation of a radioactive cloud, travelling in the direction of Pakistan.



Agha Shahi, Pakistan's Foreign Secretary stated further that "India was making a surreptitious entry into the nuclear club. A qualitatively new situation had arisen posing a nuclear threat to Pakistan's security",<sup>61</sup> thus trying to build up a world psychosis against India.

The most serious and fiercest attack came from Canada who claimed that the plutonium used as fissile material in the PNE had come<sup>from</sup> Cirus and an allegation was made saying that the plutonium had been stolen by India from the Canadian section of the Cirus reactor, instead of being subjected to Canadian safeguards.

India's stand was no credible enough for Ottawa and Washington, who promptly suspended supplies of fuel and hardware for use by India. However alternative arrangements were made by India with France for these supplies. For some time Nuclear aid to India was suspended by Atomic Energy Commission, Canada, on orders from Ottawa over technical collaboration arrangements with India. However since 1976, the hostile attitude of Ottawa has been replaced by a more rational one and in 1976 the nuclear materials supply embargo on India was lifted by Ottawa.

It is interesting to note that there was only an oral understanding about safeguards between Canada and India when

---

This was refuted by the Indian representative, B.C. Mishra who pointed out that not even hypothetically could any radio-active debris have blown to Pakistan as the wind pattern was south-west. CCD Documents/Pv. 638, pp. 33-41.

61 Ibid., pp. 30-36.

the Canada-India Reactor agreement was signed on April 28, 1956.

Article XI of the Agreement states,

It is the intention of both Governments that the fuel elements for the initial fuel charge and for continuing requirements of the Reactor will be supplied by Canada to the extent that India provides them from sources within India. Arrangements for the provision of the fuel elements to India from Canada will be agreed upon by the two Governments before the Reactor is ready to operate; if an international agency accepted to both Governments has come into being or is in prospect at that time, the terms of such an agreement will be in keeping with the principles of that agency. (62)

The Canadians sorely commented that, "Dr Bhabha's policy of flexible nuclear development had been skillfully woven into the agreement in such a way that it was impossible for Canada to insist later on adequate safeguards"<sup>63</sup>.

The charges levelled against India by Canada were indeed very critical of India's PNE and even went to the extent of pointing out, that by using the options in Article XI, India was able to secure fuel from Canada in 1960 with joint inspections and safeguards limited to the fuel only. The reactor remained outside these limited conditions; and that India strongly, "resisted the extension of IAEA controls to the provision by Canada of the CIR fuel elements"<sup>64</sup>.

According to the Canadians it seemed that India had

---

62 Barrie Tomson and Donald M. Page, "India's Option: The Nuclear Route to Achieve Goals or World Power", Individual Perspectives, July/August 1974, quoted on p. 25.

63 Ibid., p. 25.

64 Ibid.

purposively embarked on a flexible and independent nuclear power and used Canadian technological assistance as a "Catalyst" in this programme. The Canadian overtones were definitely bitter.

#### PAKISTAN'S NUCLEAR POSTURE

India's detonation of a nuclear explosive device on May 8, 1974<sup>65</sup> has strained Indo-Pak relations considerably.

Despite the official statement of the Atomic Energy Commission described it as a "peaceful nuclear explosion using an explosion device. As part of the programme of study of peaceful uses of nuclear explosions, the Government of India has undertaken a programme to keep itself abreast of developments in this technology, particularly with reference to its use in the field of mining and earth-moving operations". Pakistan however, has remained sceptical vis-a-vis India's non-nuclear weapons policy. Both India and Pakistan are still non-signatories to the NPT. Although there has been a gradual acceptance of India's non-nuclear weapons policy on the part of many countries, Pakistan's scepticism remains undiminished.<sup>66</sup> This is reflected in two Pakistani responses which are discernible - the first of these is the

---

65      Underground nuclear explosion, using plutonium as fissile material, at a depth of about 160 metres in Pokharan range of the Rajasthan desert, North-western India.

66      For a details account of Pakistan's attitude to the Indian PNE of May 18, 1974, see Documents on Disarmament, US. A.C.D.A. Washington, D.C. Statement by the Foreign Secretary of Pakistan Agha Shahi in the CCD on May 23, 1974. Pakistan's hostile attitude towards India is reflected in the very excess of the language used by Shahi.

Pakistani response to the Indian PNE and the second is the subsequent intensification of its nuclear programme. It would be interesting to study these two responses using India as the point of focus.

67

Most studies on the nuclear proliferation issue in the subcontinent have insinuated that an anticipated Indian nuclear threat is pressurizing the Pakistani nuclear weapon programme and should the latter adopt such a course of action, then the main triggering event could be the Indian PNE of 1974. However, when seriously analyzed within a wider frame of reference, some very interesting observations emerge which substantiate the need to consider the Indo-Pak relation within the sphere of South Asian influence. There is a visible Chinese influence on Pakistan. This analysis is an attempt to synthesize these forces in a proper frame of reference.

Statements by the former Prime Minister Zulfikar Ali Bhutto, suggested that Pakistan would seek the protection of super power guarantee and asserted that it would not succumb to an Indian threat or blackmail. Bhutto said:

If conventional armaments are not supplied to Pakistan under treaty obligations and if the disparity in armaments increased to the extent that it threatens the stability of South Asia, Pakistan will be duty-bound to take all measures to protect its integrity. Pakistan could not be placed at the mercy of a neighbouring country which in the field of nuclear energy is far ahead of us. (68)

- 
- 67 William Epstein, The Last Chance (Free Press, N.Y., 1976); and Lewis Dunn, India, Pakistan, Iran: A Nuclear Proliferation Chain. HI-2407, Hudson Institute Report, March 21, 1976, p.
- 68 Times of India, December 23, 1974.

Bhutto's first policy action was to take personal charge of the Pakistan Atomic Energy Commission (PAEC) in December 1971.

Bhutto also began to manipulate the threat to go nuclear to induce the US to lift its arms embargo on sales to Pakistan. Radio Pakistan, on December 19, 1974 quoted Bhutto as saying that if his country is not able to get sufficient conventional weapons, it must concentrate on acquiring a nuclear capability. If Pakistan is not able to acquire weapons, which can act as deterrent, it must forego spending on conventional weapons and make a big jump forward concentrating all its energies on acquiring the nuclear capability.

It is interesting to note, that Pakistan had till the 1971 war continued a confrontationist policy, with regard to India and tried to use China and the USA as counterweights to Indo-Soviet cooperation because Pakistan continuously invited external support (with the USA from 1954 to 1965 and 1969 to 1970, and with China from 1962 onwards).

It becomes clear therefore that Bhutto's attempts to whip up a military psychosis was not a classic syndrome of the Indian nuclear explosion of 1974 but rather the escalation of an earlier confrontationist policy which assumed velocity after May 1974 because Bhutto seemed to have made a very calculated gamble and realized that Islamabad's best bet was to capitalize on the so-called danger from India and get as much money from neighbours (the Gulf countries) together with a substantial supply of war materials from Peking and Washington.

Despite India's repeated stand that it will use its nuclear capacity for peaceful purposes alone, Pakistan seems determined to ignore this stand and seems anxious to arm itself with nuclear and conventional weapons beyond its capacity even at the extent of causing a heavy strain on its exchequer. However, in an interview broadcast on October 11, 1976 on the Radio Riyadh, Bhutto said: "We intend to use our nuclear capability only for peaceful, not for the bomb, like others".

By others it is clear he is referring to his most immediate neighbour India. It seems he is creating a convenient environment to turn world opinion in Pakistan's favour. Earlier in 1975,<sup>69</sup> Bhutto urged the Pakistani Government to give serious thought to the need to develop a viable deterrent to the enemies of nuclear threat saying: "it is necessary to have our own nuclear deterrent".

Reverting to the pre-Simla pact days, India is now invariably referred to in all matters involving the defence of Pakistan as the enemy. Bhutto thus intensified his arms acquisition campaign besides 'playing court' to China and said: "Paramount consideration is Pakistan's survival; we cannot be content merely by verbal guarantees or speeches in meetings and conferences".<sup>70</sup>

At about this time Pakistan had turned to Saudi-Arabia for financial assistance to its various plans of arms purchase and nuclear development. A large contingent of Pakistani air

---

69 Link, September 21, 1975.

70. Ibid.

force had been given the task of imparting training to Saudi Arabian airmen in the use of the latest war planes. There were also reports of increasing collaboration between the two countries in various fields, including defence. This assumes great significance in view of the U.S.-Saudi Arabian arms deal.

Pakistan's nuclear ambitions began to take on a concrete shape in early 1976 when it made a \$40 million deal with France for the purchase of a nuclear fuel reprocessing plant. Besides this, a fiscal increase of 14 per cent for defence spending for the period 1976-77 was made which accounted for almost 45 per cent of total Government revenue.

The planned purchase of the plutonium reprocessing plant created a furore all over the world. On February 23, 1976 Fred Ikle, Director of the US-ACDA in his testimony before the Senate foreign relations sub-committee on arms control, hinted that the US was discouraging Pakistan from purchasing nuclear fuel reprocessing plant from France. He stated: "Pakistan could not want such a plant for economic reasons. There is no economic justification. The reason is the iron law of nuclear proliferation. The reason for Pakistan's interest in a reprocessing plant is the Indian development of a nuclear explosive".<sup>71</sup>

He also pointed out that Pakistan's single small reactor would not justify such an expenditure. To prove the economically advantageous spending \$500 million and more would be required

---

71 Quoted by Brig. Rathy Sawhney, "Pakistan's Nuclear Ambition" in IDSA News Review on South Asia, April 1976, New Delhi.

together with spent fuel of more than 49 reactors.

However, in February 1976, the IAEA approved the agreement between Pakistan and France to set up a fuel reprocessing plant in Pakistan at an estimated cost of \$750 million. The plant is scheduled to go into operation in mid 1980. Pakistan will have to subject itself to verifications by France and IAEA in order to ensure that Pakistan is not misusing the materials and technology supplied to it by France.

A fact not to be ignored is that, while the IAEA may be able to detect diversions of nuclear materials from a reprocessing plant, it has no enforcement machinery to prevent diversion even after it has been detected.

The plutonium separation plant from France would be able to reprocess irradiated fuel from nuclear power stations with a total generating capacity of 4000 to 5000 megawatts and would be enough to serve all the plants planned for the 1980s and the existing KANUPP reactor, the entire fuel waste which was stored to be reprocessed after the installation of the plant. The Chairman of PAEC stated on 22 March 1976 that another facility to be set up at Karachi would be a nuclear training centre costing Rs.2½ crores, to train all the technicians, engineers and reactor operations required for staffing power plants and other facilities.

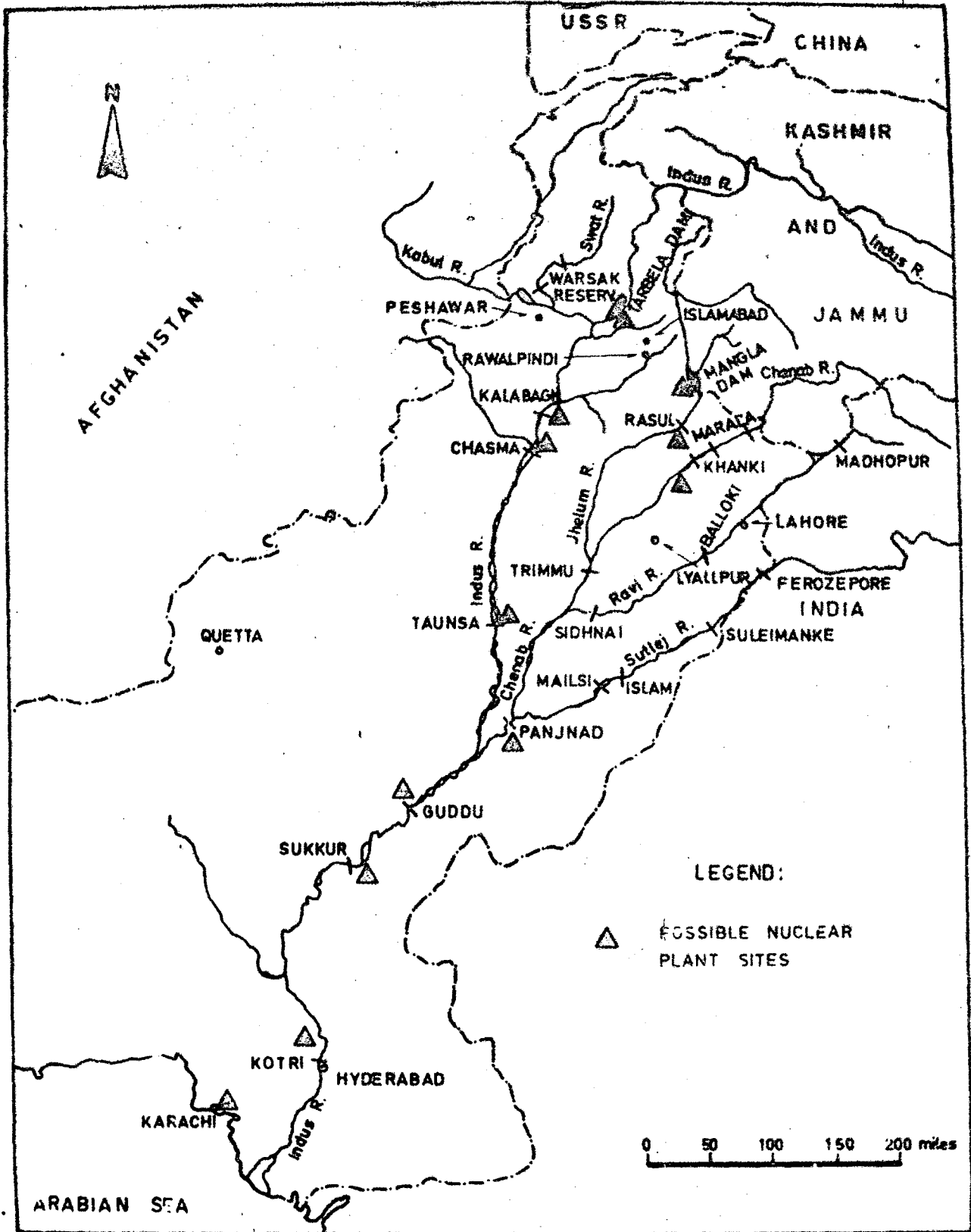
It would be appropriate at this stage to have a perspective of Pakistan's nuclear programme before making conclusive statements.

#### PAKISTAN'S ATOMIC ENERGY PROGRAMME (See fig. 7)

The Government of Pakistan instituted the Atomic Energy



FIG. 7.



MAP OF PAKISTAN SHOWING POSSIBLE SITES FOR NUCLEAR POWER PLANTS.

Committee in 1955 and in 1956 it was upgraded to Pakistan Atomic Energy Commission (PAEC). The Commission was given the manifold tasks of making recommendations regarding matters connected with atomic energy, survey in order to assess the availability of radio-active elements and implement programmes to utilize nuclear energy.

The fiscal allocation of Rs(P) 5.0 mn has been provided for research in atomic energy. Expenditure on research in atomic energy during the first five year plan (1955-60) amounted to Rs(P) 23.5 mn.

In the estimate of the second five year plan, a sum of Rs(P) 46.5 mn. was allocated for atomic energy development and provisions were made for a reactor and a sum of Rs(P) 12.5 mn. (sum includes cost of reactor). However, since the reactor was not available the provision was carried over to the next year's fiscal allocation of Rs(P) 13 mn. During the 8 year period beginning with 1960, Pakistan's expenditure on the development of nuclear technology totalled Rs(P) 34 mn. in East Pakistan (now Bangladesh), on 7 nuclear projects excluding the proposed Roopur power project. Subsequently Pakistan has extended its own nuclear programme. Allocations have been made in the 1975-76 budget for setting up a 500 MW nuclear reactor near Kundian in the Chasmah Baghage area of Punjab.

<sup>72</sup>  
PINSTECH is the nucleus around which the PAEC's activities are based. This institute is the country's leading centre

for advanced study and research in nuclear technology. In 1963 with the assistance of the IAEA, a 5 MWe "Swimming Pool" type research reactor originally promised by the USA was set up. In December 1965 this reactor became active and nuclear research activities became more accelerated. A variety of radio isotopes such as Iodine - 131, phosphorus - 32 and gold - 198 were produced.

The PAEC had set up research centres at Jamshore, Lahore, Karachi, Multan and Tandojaun in West Pakistan and Dacca, Chittagong and Rajshahi in the erstwhile East Pakistan (now Bangladesh). The US Government had given a generous grant of Rs.200,000 for research on Pest control to the Atomic Energy Agricultural Research (AEARC) centre at Tandojam. The atomic energy centre at Lahore has facilities for research in radiation physio-chemistry, and allied subjects. Lahore (established in 1961) has among the major research facilities, a 14 MW Neutron generator, a natural uranium light water moderated sub-critical assembly and a 13,000 curie cobalt 60 source. Researches in these centres are geared to develop the application of radio-active on agriculture, medicine and industry.

Pakistan's first nuclear power plant, the Karachi Nuclear Power Project (KANUPP) has a generating capacity of 137 MWe and is located 15 miles West of Karachi. The reactor uses natural uranium as fuel and heavy water as moderator and cooler. This is under IAEA safeguards. This reactor is designed to use the less expensive and more easily available natural uranium, rather than

enriched uranium. While in full capacity operation, KANUPP can produce up to 137 kg of plutonium per year.<sup>73</sup>

Pakistan does not have significant thorium deposits but has a substantial quantity of uranium deposits in the Gilgit and Dera Ghazi Khan areas. A team of Czechoslovakian mining experts prepared a feasibility study in the Dera Ghazi Khan area.

The power reactor in Chashma Barrage in Mianwali district is expected to produce between 500 and 600 MW of power by 1980-1981 with Canadian assistance. The IAEA has approved of the Pakistan programme of acquiring 8 nuclear power units in 1980 and 11 nuclear power units in the following decades.

A dual purpose desalination plant is also planned to be set up near Karachi with a capacity of 300 MWe of power and 150 million gallons of water each day. A nuclear fuel fabrication plant from Canada and heavy water plants from Belgium, France and West Germany are under negotiations. The plutonium reprocessing plant to be purchased from France will constitute an important part of the complex facilities as stated by Munir Ahmed Khan,<sup>74</sup> Chairman of the PAEC.

Pakistan has also been experimenting with weather rockets, and allied activities and has made commendable progress in this area. The first rocket manufactured in Pakistan was launched successfully on March 31, 1969 from Sonmiani rocket range. The

---

73 Natural Uranium U - 238 must be enriched up to 3 per cent to 4 per cent of U - 235 to be used as reactor fuel and to a level of about 90 per cent to become bomb material.

74 Economic Times, October 18, 1976.

two stage rocket attained a height of 140 km carrying a scientific payload of 40 kgs.

Pakistan has been receiving assistance from the US, Canada and the UNO. It has also concluded agreements for co-operation in the R & D of atomic technology with various foreign powers. In 1962 PAEC entered into an agreement with France for supply of materials and co-operation. In 1965 it concluded a co-operation agreement with Denmark and Canada. The latter agreed to provide \$65 mn aid for it. In 1966 PAEC signed an agreement of collaboration with Italy in the field of training and supply of nuclear materials and equipment. During the same year, Spain also signed the agreement for collaboration with Pakistan. In July 1966 China signed the "economic and technical co-operation" agreement. Pakistan has since strengthened its ties with China.

A Chinese delegation led by Kuo Pei-shan, Chairman of the revolutionary committee of Chinese Academy of Sciences, arrived in Rawalpindi on December 12, 1974. The exact nature of help is not known but informed sources said that all possible help would be rendered for Rawalpindi to go nuclear. Pakistani scientists are getting training in China on nuclear physics.

Pakistan has also entered into a collaborative agreement with Turkey and Poland in addition to Japan, Czechoslovakia and Australia besides ordering Rs(P) 750,000 worth of equipment from Poland.

However despite all this Pakistan is still almost ten years

behind India in its nuclear development. SIPRI lists it as a "near nuclear country" but the direction of Pakistan's nuclear programme appears ambiguous.

There are certain limitations which can cause major delay in achieving the PAEC's ambitions of a 25 year nuclear programme in which by the year 2000 AD, two-thirds of Pakistan's power needs will be met by nuclear technology. The major one is Pakistan's heavy dependence on collaborative arrangements. As Sethna, Chairman of the Indian IAEC, points out Pakistan will require not less than 6 years to produce fuel requirements of its own and between 8 and 9 years to set up an indigenous nuclear reactor.

### Section III

#### OBJECTIVE CHOICE OF PREFERENCES

##### Nuclear Non-Proliferation and the Theory of Meta-Games

In the process of establishing the nature and utility of Meta-Games in trying to negotiate the complex problematic situations found in international politics, it becomes necessary to discuss in brief at least, the notion of Game theory.<sup>76</sup>

The pioneers in the development of this theory were Von Neuman and Morgensteru whose object was the creation of theoretical models designed to play the same role in economic theory as the various geometrico-mathematical models have in physical theory. Admittedly, game theory in its simplest form is an extreme abstraction oversimplifying in many ways the actual state of affairs of a game or war situation. But over time the basic structure game of theory has undergone much refinement and is currently quite sophisticated and capable enough to take situations as they exist.

A 'game' according to Von Neuman is a contest between a number of players, played for fun or forfeit, according to some predetermined rules, and decided by skill, strength, or chance.

---

76 This account is drawn from the following: Anatol Rapoport, Fights, Games and Debates (Ann Arbor, University of Michigan Press, 1963); Melvin Dresher, Games of Strategy: Theory and Application (Prentice Hall, N.J., Englew and Cliff, 1961); and M. Shurik and G.D. Brewer, Models, Simulation and Games: A Survey, Randir-1060-ARPA/RC, May 1972, Rand Corporation, Santa Monica, Ca.

Although a game may be played for mere fun or some non-monetary forfeit, for most econometric and social purposes it would do if it were assumed to be played for money or a utility, which can be measured. Game theory seeks to resolve multiple interest conflict problems and sets as its goal the task of locating the best strategies in any given situation. Thus it is built up on the concept of optimal utility.

A game is best described as a set of rules which prescribe the formal boundaries and internal structure of a competitive situation, These rules are:

(1) The strategies or alternatives among which a choice is to be made by the players are prescribed (known as Moves). Each strategy or alternative involves a number of moves, each containing a set of directions.

(2) The game specifies the kind of information that is made available to the players to decide upon a strategy.

(3) The game also specifies the payoffs available to each player at the end of the game. A payoff is usually associated with every conceivable move or play of the game from the beginning to the end of the game. These payoffs are made by one opponent to the other. A simple example of this is the zero-sum game, where when one player loses, the other gains, and no payoffs enter from an outside source. Example of a zero sum game:

A coin matching game in which each player shows one side of his coin; player A winning one unit if they turn out to be similar and losing one unit if they turn out to be dissimilar.



		Player B	
		Heads	Tails
Player A	Heads	1	- 1
	Tails	- 1	1

However, it is not always the case in all games and usually in more complex situation a payoff matrix has to be set up and must give two payoffs ( $++$ ,  $--$ ,  $+-$ ,  $-+$ ) one to each player for each entry in the payoff matrix. The objective of each player being to choose that strategy that has the maximum payoff while the opponent tries to minimize the maximum loss, which he may have incurred. The normal form of a game utilizes a payoff matrix which is analyzed with reference to the payoffs corresponding to strategies and not to moves.

Game theory is occupied with the optimization of individual utilities against those individuals who rationally pursue their own utility.<sup>77</sup> Rational behaviour is defined as the strategy most likely to lead to the satisfaction of objectives. But rational behaviour is not necessarily always ethical and vice-versa. Game theory is not a theory about ethics and the attitudes of players do not matter in games because they are normative and concern themselves to giving the best strategies<sup>78</sup> regardless of

---

77 J.C. Harsanyi, "A General Theory of Rational Behaviour in Game Situations", Econometrica, March 1964.

78 Games that illustrate this point effectively are zero sum games. The problem arises when non-zero sum games are considered e.g. Game of the Prisoners dilemma or chicken for which no satisfactory normative theory exists since these are non-cooperative games.

attitudes. Thus it becomes obvious that to consider attitudes one must go beyond the basic game theory. Meta-game theory is a recent development of the basic game theory and allows to establish a meta-game equilibrium by considering attitudes. "Meta-game theory is an analysis of a conflict situation to find the equilibria and their corresponding policies. By a choice of policies and counter policies the players can induce each other towards equilibrium. It is essential to identify the actual strategies available to the opponents and to recognize the policies can and must be formulated by each player and that both players will seek an equilibrium outcome".<sup>79</sup>

While Basic Game theory uses optimization as its objective and remains characteristically normative, Meta-game theory is descriptive and uses only ordinal utilities and introduces responses or patterns of reactions or policies that help to decide upon a particular strategy to counter the opponents strategy while supplying a number of counter policies for the opponent so that it may be able to respond to the first set of policies.<sup>80</sup>

The meta-game theory can thus be used in a dynamic way because it is possible to alter the preferences according to changes in the international scene. Meta-game is best known by Analysis of Option Technique<sup>81</sup> which is a refined version of the

79 Thomas L. Saaty, Mathematical Models of Arms Control and Disarmament. Application of Mathematical Structures in Politics (New York, John Wiley & Sons, 1968), p. 95.

80 Nigel Howard, "The Theory of Meta-Games", Management Science Centre, University of Pennsylvania, May 1966.

81 Through the works of Howard 1968, 69, 71; Sody 1968, Bain, Howard and Saaty 1971. A detailed account can be

theory of meta-games.

The particular power of this technique is its ability to cut through pre-conceived notions or opinions on complex subjects.

It becomes imperative to make a distinction between the concepts of preferences and capabilities and to clarify our situation before proceeding further. Social scientists invariably fail to capture the essentials when coming up with distinctions involved in such concepts. The more confident one is of one's ideological model, the less incentive to put it to the empirical test or even the deductive test. Thus conceptual clarity is sought for the purposes of this analysis by postulating a set of foreign policy objectives for the specific actors which have been called options. The actors are free to choose that option they feel is most suitable and this choice is called the preference. Capability on the other hand, is the means or capacity to achieve these preferred objectives.

Care is taken to avoid any scientifically induced ideological controversy by adopting a methodology which makes room for both sides in the analysis. The basic assumption remains that each of the specific actors in the international system have a well defined set of preferred objectives. Care has also been taken not to favour any particular set of preferred objectives or impose restrictions on any other set.

---

had from ACDA/ST-1492, Mimeographed Report. Management Science Centre, University of Pennsylvania, The Analysis of Options: A Computer aided method of answering political problems.

## FORMAT AND ANALYSIS

1. Historical Background

Any analysis of options technique begins with an account of the historical background, recent developments - both socio-economic and political, of the actors involved. This serves to explain the assumptions regarding the preferences which are made in the analysis. This has already been done in sections I and II where the attitudes of the actors were established with regard to ACD measures and specially the question of nuclear proliferation.

2. Terminology

An important and preliminary stage in developing the model is the selection of suitable terminology to describe the parties involved. This has already been accomplished in the conceptual framework. The object is to avoid any implicit assumptions about the preferences of the parties. Ultimately the use of symbols allow a more concise presentation in the form of individual tableaux (Symbol Used are O & I).

3. Alternative Structure

Comprising of all possible options are listed.

Selection of Parties and Options

The first stage is to list all the parties involved and their options. "An option is defined to be any action which may be taken by a party to the conflict and which is relevant to the final outcome. The set of all possible courses of action may then be generated by indicating whether or not each option is

82  
taken".

#### 4. Scenarios and Their Classification

A given outcome or scenario may be described by assigning to each option 'I' if the option is taken and 'O' if the option is not taken. A '-' may be read either as 'O or I'. Thus a column of 'I's or 'O's and '-s describes each outcome. Columns representing impossible combination of choices are designated 'Infeasible'.

An outcome (the particular outcome) is examined from the point of view of one of the participants say India. Those outcomes that arise from changes in India's choices only with the choice of other players remaining fixed are classified by India as "preferred" or "non-preferred" to the original outcome. The original outcome is called the status quo<sup>83</sup> for the present outcome. This creates a division of India's choices into sets; the particular outcome, the preferred set of columns, the non-preferred set and the infeasible set. This division may be shown in a tableau. There is no attempt to create an ordering among the preferred or non-preferred in an individual tableau.

#### 5. Improvements and Sanctions

The columns in the preferred set represent possible

---

82 Joyce M. Alexander, "An Operations Research Approach to Conflict Resolution", Paper presented at the seminar on Conflict Resolution (Department of State, Washington, D.C., 1975).

83 Status quo reflects the values from real life as it is at the time of the option.

unilateral improvements for a particular actor e.g. India. If there are any such improvements, India would prefer to move to one of the new outcomes. If, however, one or more of the other parties could make challenges, so that India would be in a position, non-preferred to the particular outcome, even after choosing her best possible reaction to the changes, then these changes of the other parties constitute a sanction against the possible improvements open to India. The particular outcome is then said to be potentially stable for India. If India considers it credible that the sanction can be applied then the outcome is unstable for India. If India has no unilateral improvements, then the outcome is automatically stable for India.

#### 6. The Analysis

This is shown finally in a graphically summarized form by showing the instability or potential stability of the most interesting scenarios. All possible sanctions should be shown so that the decision-makers may assess their credibility. The analyst may often assist in this evaluation by presenting his reasons for accepting or rejecting the credibility of particular sanctions.

The problem is, thus, completely structured and there is an explicit statement of the assumption of all information necessary for a final decision. The method does not yield solution, but draws attention to those policies likely to provide a satisfactory solution to the question at hand.

## 7. Conclusion

Finally it must be noted that changes are made by the actor under consideration only. The actor may not like the given scenario, but there may be nothing, which he can do unilaterally to improve it. A change in the assumption about what is preferred or non-preferred, by a particular actor, could have an effect on the 'best' solution. However, one of the strengths of the method of Analysis of Options is that the essential assumptions are demonstrated in the nature of the sanctions.

## 8. Particular Merits of the Analysis of Options Technique 84

- (1) The assumptions in the analysis are minimal.
- (2) There is no loss of contact with data.
- (3) The technique is as value-free, as specially considering the presence of human analyst.
- (4) The technique does not require a complete preference ordering.
- (5) The method requires only ordinal preferences.

### Operation

Problem: Nuclear proliferation as it affects India and Pakistan

Participants: India, Pakistan and China

Issues: (a) Defensive against nuclear confrontation (threat or blackmail)

(b) Regional no-war defence pact

(c) Seek nuclear umbrella

OptionsStatus quo

## INDIA

- |   |   |
|---|---|
| 1. Develop nuclear arms                               | 0 |
| 2. Confront Pakistan with nuclear arms                | 0 |
| 3. Confront China with nuclear arms                   | 0 |
| 4. Opt for non-nuclear defence pact with Pakistan     | 0 |
| 5. Opt for nuclear umbrella or some nuclear guarantee | 0 |

## PAKISTAN

- |  |   |
|--|---|
| 6. Develop nuclear arms                | 0 |
| 7. Confront India with nuclear arms    | 0 |
| 8. Nuclear defence pact with China     | 0 |
| 9. Non-nuclear defence pact with India | 0 |

## CHINA

- |  |   |
|--|---|
| 10. Confront India with nuclear arms           | 0 |
| 11. Opt for nuclear defence pact with Pakistan | 0 |

Meta-game theory can be applied to analyze the stability of this alternative (the status quo) if it can be decided, for each other alternative, whether or not each actor prefers it to the status quo. There are  $2^{11} = 2048$  possible alternatives, many of which can be grouped in the same preference class because of only slight differences in their effect.

The meta-game analysis of the status quo will tell us (1) whether it is a possible equilibrium, (2) if it is, what are the policies that will keep it in equilibrium, (3) is the outcome preferred by all?, (4) is it a kantian equilibrium, that is fully cooperative equilibrium?



## ANALYSIS

## INDIVIDUAL PREFERENCE CHOICE TABLES

Table 2.1 : India

S. No.	Preferred Alternative	Status Quo	Not Preferred Alternative
1	00	0	11
2	00	0	11
3	00	0	11
4	11	0	00
5	01	0	11
6	00	0	11
7	00	0	11
8	00	0	11
9	11	0	00
10	00	0	11
11	00	0	11

Note: Entry No. 5 denotes that non-nuclear India would not prefer to seek a nuclear umbrella guarantee. But should the necessity arise there is a possibility of seeking nuclear protection of some sort. This is not a very categorical fact or policy statement at this point in time and hence is denoted by 01 which implies No - Yes, i.e. probably will seek nuclear security reluctantly.

Table 2.2 : Pakistan

	Preferred Alter- native	Status Quo	Not Preferred Alter- native
1	00	0	11
2	00	0	11
3	01	0	00
4	00	0	11
5	00	0	11
6	01	0	00
7	01	0	11
8	11	0	00
9	00	0	11
10	11	0	00
11	11	0	00

Note: Entry No. 3 shows that Pakistan prefers that in the event of a nuclear weapon India, the latter should engage in nuclear confrontation with China rather than not be challenged at all. This preference is not very strong and is displayed as 01 because should India engage in a nuclear confrontation with China and become overpowered one problematic feature manifest itself along with the benefits that accrue to Pakistan - that is, the System power Supremacy of China which though not detrimental to Pakistan is not wholly acceptable.

Entry No. 6 suggests that though Pakistan would not prefer to develop nuclear arms, should its security be endangered and a substantial threat perception is established, then it will go nuclear vis-a-vis weapons.

Table 2.3 : China

	Preferred Alter- native	Status Quo	Not Preferred Alter- native
1	00	0	11
2	01	0	11
3	01	0	00
4	00	0	11
5	00	0	11
6	10	0	00
7	01	0	00
8	11	0	00
9	00	0	11
10	01	0	00
11	11	0	00

Note: Entry No. 3, 01 indicates that China does not totally prefer India to launch a nuclear attack on China, though such an attack will not place the latter in a dangerous position. However, it is not preferred that such an action is not contemplated by India (00) because the Not Preferred alternative of 10 suggests that China will retaliate should it be provoked.

Entry No. 6 suggests that China would prefer Pakistan to develop nuclear arms should the system equilibrium become increasingly unstable - therefore 10 as opposed to the Not Preferred alternative of 00.

## Analyses of Equilibrium

Table 3.1 : Pakistan and the Status Quo

	P.	A.		Status Quo	N.	P.	A.
1	00	00	--	0	--	11	--
2	--	--	00	0	11	--	11
3	--	--	01	0	01	--	00
4	00	00	--	0	11	10	--
5	00	00	--	0	11	11	--
6	11	--	--	0	00	00	00
7	--	11	11	0	11	--	00
8	11	11	11	0	00	01	00
9	00	00	--	0	11	10	--
10	--	11	11	0	00	01	00
11	11	11	11	0	00	01	00
	Sino-Pak defence pact. No confrontations	India non-nuclear, confronted by Sino-Pak Pact	Nuclear India, confronted by Sino-Pak Pact		India non-nuclear with nuclear umbrella	non-nuclear defense pact with India	Nuclear India confronts Pakistan

Note: "Nuclear India" for the purpose of this analysis refers to nuclear weapons possession and not the possession of nuclear capacity.

Sino-Pak defense Pact refers to a nuclear weapons using Pact.

Table 3.2 : India and the Status Quo

	P.	A.	Status Quo		N.	P.	A.
1	00	00	0	11	11	11	11
2	--	00	0	--	11	11	--
3	--	00	0	--	11	11	--
4	11	11	0	00	00	00	00
5	00	00	0	11	--	--	--
6	00	00	0	11	11	11	11
7	00	00	0	11	11	11	11
8	00	00	0	11	11	01	11
9	11	11	0	00	00	00	00
10	00	00	0	11	11	11	11
11	00	00	0	11	11	11	11
	India non-nuclear, defense pact with Pak	India non-nuclear with nuclear umbrella		India non-nuclear, confronted by Sino-Pak defense pact	India nuclear, no pact, confronts China	India nuclear, no pact, confronts Pak	India nuclear, no pact, no confrontations

Table 3.3 : China and the Status Quo

	P.	A.		Status Quo	N.	P.	A.
1	00	00	--	0	--	--	--
2	--	--	--	0	01	--	--
3	--	--	--	0	10	--	--
4	00	00	00	0	--	11	11
5	00	--	00	0	--	11	11
6	10	10	10	0	00	00	00
7	11	11	11	0	00	01	00
8	11	11	11	0	00	00	00
9	00	00	00	0	--	11	11
10	11	11	11	0	00	01	00
11	11	11	11	0	00	00	00
	Nuclear defense pact with Pak. India non- nuclear	India nuclear, no um- brella no con- fronta- tions	No Pak defense Pact confronts India		India nuclear and con- fronts China	India non- nuclear with nuclear umbrella	non- nuclear defense Pact between India and Pak.

### Results of the General Analysis

1. The status quo is a possible equilibrium.
2. It is kept in equilibrium by these policies
  - a) Positive Indian attitude towards a no-war pact (non-nuclear) with Pakistan.
  - b) The Indian attitude and the policy of non-alignment clearly indicate no Indian nuclear threat.
  - c) Indian Government's attitude clearly indicates that a possible Chinese nuclear threat alone, has not and will not induce India towards the acquisition of nuclear weapons (see Table 3.1).
3. The status quo is undominated - i.e. no alternative suggested is better for all.
4. The status quo is not Kantian i.e. is not fully co-operative. China will always prefer that there be no Indo-Pak defence pact (see Table 3.2). Pakistan will always prefer that China confront India with no resistance (for example India gives up "occupied Kashmir" to Pakistan apart from concessions to the Chinese) (see Table 3.1).

### Analysts Note

One possible option has not been offered to Pakistan. That is, a no-war nuclear defence union with India. This option belongs very firmly to the "infeasible category". India has made it very obvious that nothing will induce it to acquire nuclear weapons, least of all under the protection of a military pact with Pakistan.

For similar reasons, another possibility has also been infeasible - a nuclear defence pact involving China, India and Pakistan. The Indian attitude manifested in the analysis is well defined in the statement by the Indian representative B.C. Mishra in the CCD on May 23, 1974,<sup>85</sup> where he states explicitly that India will never consider of becoming an active member of any nuclear defence pact.

---

85. Government of India, PIB, Press Release, June 7, 1974, pp. 38-41.



## CONCLUSION

As the preceding analysis has pointed out it is possible  
86  
to maintain the present status quo in the universe under consideration if both India and Pakistan improve their relations, settle their disputes using peaceful means and enter into a no-war defence pact (non-nuclear) which will minimize tension and create greater co-operation in all fields of industry and technology, generate monopolistic policies and maintain the system at the present status quo level where no one country can be said to dominate the power structure in the international system under discussion, at this point in time. However, now progressing beyond what can and should be, what is likely to be is indeed an alarming possibility. It seems, that Pakistan is unwilling to accept the present status quo, its attitudes and actions seek to generate a powerful system disturbance tension which could have very serious and crucial consequences.

87  
Z.A. Bhutto was not in favour of nuclear ties with India. His attitude was clearly one of non-cooperation. Commenting on the offer of the Indian Prime Minister Desai that India was willing to provide know-how to Pakistan for developing nuclear energy for peaceful purposes, he said he had his doubts about a collaborative agreement being reached. During this interview he also reiterated the Pakistani stand to go ahead with its nuclear

---

86 Absence of nuclear weapons in India, Pakistan, Afghanistan and Iran.

87 Times of India, June 22, 1977.

programme and to purchase the plutonium reprocessing plant from France. Pakistan's future policy is probably a reaction to the Indian PNE of 1974. "Thus, in response to Indian resumption of "PNE" testing, probable after completion in 1978 of Canadian assistance to India's nuclear programme, Pakistan could well initiate covert preparations for an eventual nuclear weapons programme. In turn, should India decide to go nuclear vis-a-vis weapons in the early 1980s then Pakistan is not unlikely to respond by attempting to develop its own nuclear weapons".<sup>88</sup> However this would require violation of certain safeguards and would not result in the acquisition of a very sophisticated nuclear weapons force. Because Pakistan might be able to build up its nuclear stockpile only at a rate of 2-4 fission weapons per year, relying upon nuclear capable aircraft for delivery. Developing reliable and redundant command, control and communication systems, as well as protecting against an Indian surprise attack, could be a problem together with the obvious fiscal constraints involved in such a programme of nuclear weapons development.

89

As Anwar H. Syed points out however that despite these technical and economic constraints such a nuclear force might be considered essential to avoid a "nuclear Munich" at India's hands. As for reliance on other super powers, either a nuclear guarantee or aid might be unobtainable and a nuclear guarantee would not

88 Lewis Dunn, n. , p. 13. However, Morarji Desai has stated in the Lok Sabha on December 13, 1977 that India will not have any more PNE tests.

89 Anwar H. Syed, "Pakistan's Security Problems: A Bill of Constraints", Orbis, vol. XIV, no. 4, Winter 1973, pp. 952-74.

reduce the political crisis in Pakistan or the ensuing domestic political upheaval likely to erupt in the event of India adopting a nuclear weapons programme. Very relevant here is Kissinger's comment that the line of nuclear proliferation must be drawn somewhere, and Pakistan is the place where he seeks to draw it, even if it means cutting of all economic and defence aid. According to him, "India on Pakistan's eastern border has the bomb, China to the north has the bomb, Afghanistan to the north-west has no bomb, but it has Russia. And to the West there is Iran, buying pellmell an array of military hardware that would make America itself seem underequipped".<sup>90</sup>

It is possible that Pakistan could seek to circumvent the constraining effect of dependence upon foreign nuclear powers and to reduce the risk of external sanctions.

Another basic objective of going nuclear could be to maintain its territorial integrity and in this Pakistan can expect considerable aid from Iran, who for obvious geopolitical security desires to maintain a Pakistan as a buffer state to inhibit Soviet encirclement and the possibility of Soviet presence on the Persian Gulf, besides the danger of the emergence of an independent Baluchistan which is not a comforting factor for the territorial sovereignty of Iran or Pakistan.

This seems a more plausible reason for Pakistani nuclear weapons programme should such an event occur. This argument is substantiated by Robert Sandoval's analysis according to which,

the proliferation of "low yield, limited nuclear weapons", as opposed to what he refers to as, "long range destructive or retaliatory weapons", would not be destabilizing. He says, "with the defence of its borders entrusted to forces structured around the firepower of nuclear weapons, any nation not now a nuclear weapons power, and not harbouring ambitions for territorial aggrandizement, could walk like a porcupine through the forests of international affairs; no threat to its neighbours, too prickly<sup>91</sup> for predators to swallow".

Following Sandoval's argument it naturally follows that existing regional confrontations would be diffused and if this is sufficiently widespread it could minimize external intervention in regional confrontations. Sandoval concludes the adoption of nuclear defenses could make territorial aggrandizement "obsolete" and "destructive strategic nuclear weaponry...anachronistic".

This argument is more in keeping with Pakistan's desire to become invulnerable to a surprise Indian attack and probable threat from the North-West frontier province and Baluchistan, as once equipped with minimal capacity (at least first strike).<sup>92</sup> Pakistan would deter conventional attacks of violence and make it more or less impregnable to any sort of regional nuclear threat for fear of an escalation into a prolonged and damaging nuclear conflict. A stable system of deterrence may be entirely possible

---

91 R. Robert Sandoval, "Consider the Porcupine: Another View of Nuclear Proliferation", Bulletin of Atomic Scientist May 1976, p. 19.

92 Fierre Gallois, Balance of Terror (Boston, Houghton Mifflin Co., 1961), p. 162.

and this is probably what Pakistan is aiming at - keeping its options open and drawing up scenarios to maintain its status quo in the Asian scene.

This line of reasoning is substantiated by certain critical observations that emerge upon examining Pakistan's nuclear programme. It is important to see whether it is economical for Pakistan to produce nuclear energy rather than increase its non-nuclear energy production and purchase energy from external sources.

The IAEA <sup>93</sup> estimates show that the total capacity of nuclear plants in the developing world should amount to about 160,000 MW between 1980 and 1990. The estimate is based on the optimum energy solution for the energy problems of developing countries. The IAEA estimate suggests a significant increase in Pakistan's energy consumption and forecasts a figure of 23,000 MW in the year 2000 (while Pakistan's installed capacity in 1973 was 1850 MW. This estimate is based in a detailed analysis this Akoi method as Zalmay Khalilzad <sup>94</sup> points out in a detailed analysis this Akoi method is not an appropriate means of analysis here because the method states a relationship between the per capita consumption of energy and the GNP per capita. The GNP in this

---

93 Market Survey for Nuclear Power in the Developing Countries 1974. Edition of International Atomic Energy Agency, Vienna, 1974, p. 10.

94 Zalmay Khalilzad, "Pakistan: The Making of a Nuclear Power", Asian Survey, January 1976, vol. 16, p. 581.

simple linear regression analysis is the independent variable and upon which the dependent variable - energy demand is predicted.<sup>95</sup> (SRA Fig. 8.)

Given the GNP's of India and Pakistan<sup>95</sup> and using the Akoi method, a significant difference in energy consumption per capita should follow. But in this case this is not true. Similar examples can be found in the case of Spain and Argentina, Yugoslavia and Mexico, Brazil and Taiwan, Bulgaria and Hungary. Zalmay Khalilzad concludes:

The assumption of a rapidly rising consumption of electricity in Pakistan is inconsistent with reported data. Rather than increasing, the per capita production of energy decreased from 116 Kwh/capita in 1970 to 84 Kwh/capita in 1973. This decrease occurred at a time when the GNP per capita was increasing and is attributable to a rapid population growth rate (3.1% annually). Thus, the evidence hardly supports an assumption of rapid demand rise.

In 1975 the average per capita power extenuated for the developing countries was expected to be 290 watts. (96) Pakistan had planned to have an installed capacity of 2680 MW by 1975. With its population of 71 million the per capita availability of energy would have been about 32 watts. (Sweden's average per capita energy was 1820 watts in 1970). Clearly Pakistan is far behind most developing countries in production of energy. Large parts of the country do not have any electricity. Although most of the Pakistanis live in the villages, rural electricity is very limited - only about 30% of the dwellings in the country have been equipped with electricity. Thus given the average of 290 watts per capita for all the developing countries and Pakistan's 71 million population for Pakistan to achieve the third world average, it should produce 20590 MW. (97)

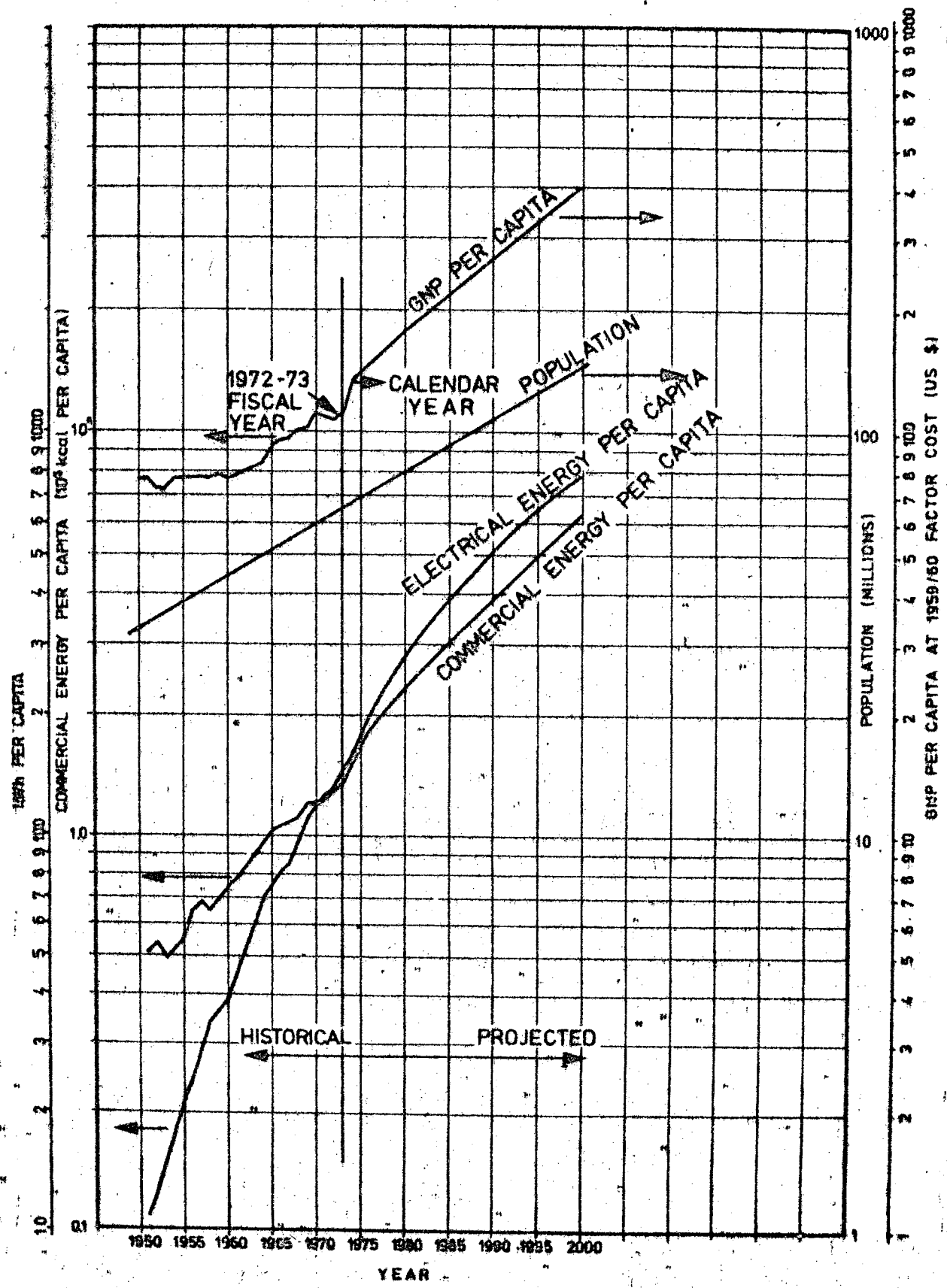
---

95 India \$91; Pakistan \$162.

96 India 112 Kwh/capita; Pakistan 116 Kwh/capita in 1970.

97 Zalmay Khalilzad, n. 94, p. 582.

FIG. 8.



TREND CURVES FOR POPULATION, PER CAPITA GNP (1959/60 FACTOR COST) AND PER CAPITA ENERGY CONSUMPTION IN PAKISTAN.

Pakistan's stand of developing nuclear energy on economic grounds does not assume the status of a credible posture. For a developing country with the obvious economic constraints it would seem more sensible to use its natural resources to fulfil energy needs around Pakistan. Pakistan has significant deposits of natural gas, coal and hydro-electrical potential all of which have not been fully exploited (see Table ). The IAEA study is losing credibility because Pakistan's GNP growth for 1977 was reported<sup>98</sup> to be a miniscule 0.5 per cent as against 3.8 per cent of last year; with farm output down to 2.2 per cent (against 4.5 per cent) and a minus growth in industrial production. The obvious fiscal constraints do not justify such a significant expenditure on the development of nuclear power resources in Pakistan. Thus, though Pakistan as a sovereign state has every right to go nuclear and use civilian nuclear technology, the economic viability of such an action is deeply questioned and does not seem to justify Pakistan's stand.

It is futile to abstract Pakistan's nuclear posture to the height of a grand theory - it is part of a larger system of State involving political pressures, policy flows, economic inputs and outputs and social needs of any particular nation state.

The conventional arguments against developing nation's movement towards the acquisition of nuclear power are not acceptable any more. Abstractions like irresponsibility inherent in

---

98 India Today (New Delhi, Thompson Living Media), December 1-15, 1977, p. 69.



developing nations vis-a-vis handling nuclear programmes, fiscal constraints and other economic disadvantages are coming under increasingly hard scrutiny and being rejected. What emerges from deeper analysis is the fact that acquiring nuclear power seems to have assumed the status of a socio-political-economic deterrence instrument. The possession of nuclear capacity undoubtedly buttresses one's bargaining capacity, strengthens domestic morale and acts as a defence against invasion.<sup>99</sup>

Thus Pakistan's nuclear posture must be viewed in a wider perspective. It is obvious, that its intensification was started off by the then Prime Minister Bhutto, in a very aggressive fashion trying to justify a possible nuclear weapons programme in the future using India's PNE of 1974 as the apparent triggering factor. But, as it has become clear there is more to the issue than Bhutto's allegations. There is the very concrete reality that by 1981 Pakistan's total nuclear power capacity will be 126 MWe<sup>100</sup> and by 1984 will have a total nuclear power capacity of 726 Mwes and two power reactors operating of power 20 Mwe's. Know-how for reprocessing spent fuel is widespread and component parts can be bought on the international market virtually without interference from the 'London Club Trigger list'.<sup>101</sup> 60 Mwe

99 Depending on the level of sophisticated nuclear weapons possessed. It is understood that a country possessing only minimal nuclear advantage would not instigate a conflict with a sophisticated nuclear power.

100 SIPRI Year Book, Stockholm, 1975, p. 23.

101 The 'London Club' has 14 members and 1 observer - Belgium, Canada, Czechoslovakia, France, FRG, GDR, Italy, Japan,

produces about 30 kgs of weapons grade plutonium per year - this gives enough for 3 atomic bombs per year giving Pakistan a total capacity of 36 atomic bombs per year from 1984 onwards using nuclear power. This is not a very pleasing state of affairs; as it could lull Pakistan into a false sense of security and launch on a programme of territorial aggrandizement particularly with the N.W. frontier province and Afghanistan and could very easily start off a power struggle built on the nuclear arms acquisition criteria in the regions of Middle and South Asia. Political and diplomatic confrontations cannot be considered simply reflexes of particular technological events. They are historical developments arising from complex, social, cultural and ecological interactions. Recognizing technological factors in causing socio-cultural change does not force one to espouse a complete technological determinism. Man's bi-cultural evolution is far too complicated a process to be subsumed under single factor explanations.

It is, therefore, unnecessary to defend the Indian Atomic Energy programme against the often critical and unfriendly analysis that is easily available in nuclear non-proliferation literature since 1974. These critics have covered a wide-range beginning with alleged intentions on India's part of plans to develop nuclear weapons from as early as 1948,<sup>102</sup> to highlighting India's

---

the Netherlands, Poland, Sweden, the U.K., the USA and the USSR, Switzerland attends as an observer - started in 1975 to control export of certain nuclear material equipment and technology.

102 Ashok Kapur, "India and the Atom", Bulletin of the Atomic Scientists, September 1974, pp. 27-30.

efforts in the development of an ambitious Atomic Energy attempt to gain some bargaining power in world politics, and to confront Communist China with a tangible choice of options.

Analysis of these and other such comments are at best only postulations; because if India intended to "go nuclear" vis-a-vis a weapons programme, it could be done so at the latest during the sixties, when the 'pro-bomb lobby was actively campaigning for adequate defence needs.

But India's nuclear policy attitude is based on principles much deeper than mere defence threats. Since the Chinese nuclear explosion in 1964 when India has lived under a nuclear threat that has consistently been enlarging. The faith in non-violence and Buddhist teachings have been at the very base of India's attitude towards arms control and disarmament and helped to shape much of the world opinion in favour of using atomic energy for peace and prosperity rather than to annihilate even in defence.

India's firm stand on non-proliferation of weapons seems to have at last acquired the credibility it lacked after Pokhran. The US President Jimmy Carter's visit to India on January 1, 1978 has confirmed Washington's acceptance of New Delhi's nuclear

---

103 John Maddox, Prospects for Nuclear Proliferation, Adelphi Papers, No. 113 (London - IISS, 1975), p. 19. Bhabani Sen Gupta, "How Close is India to the Bomb?" in Geoffrey Kemp, R.L. Pfaltzgraff and U.R. Ra'an, eds., The Superpowers in a Multinuclear World (Lexington, Mass., D. Heath & Co., 1974), p. 108.

104 A more objective and partially acceptable view is taken by M.S. Rajan who stresses India's fear of "technological colonialism". M.S. Rajan, "India: A Case of Power Without Force", International Journal, vol. XXX, no. 2, Spring 1975, pp. 299-325.

posture as credible and noteworthy.

Immediately after President Carter's <sup>105</sup> visit India was again the host, to the British Premier Callaghan who commented favourably about India's firm stand on the NPT and explicit <sup>106</sup> statement of her intentions and plans.

India certainly has become more than just a developing Third World nation - it has become a unique power, it is not a nuclear weapon state, nor is it a non-nuclear power. India has established by deed that the NPT is based on values and beliefs that are now decadent.

The nuclear policy of any nation is based on a system of faiths and beliefs that are derived from temporal reality. Sometimes temporal reality derives its system of values and beliefs from the reality of the past - the Indian case is one such syndrome. Pakistan's attitudes and policies - defence and nuclear - however seem to be indeed of conceptual reorganization in which they must strive to look beyond. Being bound to one's own perceptions will ultimately have chillingly awesome consequences,

---

105 Times of India, January 3, 1978; January 6, 1978. President Jimmy Carter offered increased co-operation in the nuclear field to India and an offer was extended by the USA to supply nuclear fuel for the Tarapore plant as per the original agreement (enriched uranium) as well as shipments of heavy water from the US reserves to make up for the losses caused by the recent explosion at the Baroda plant. Morarji Desai also firmly reiterated India's stand, he said, "Uranium or not, India won't sign NPT". President Carter also stated that plans were under way with the USSR and Britain towards a comprehensive test ban treaty.

106 Times of India, January 5 and 6, 1978.

a possibility that mankind must avoid. 107

---

107     Apart from nuclear halocaust, the most persistent nightmare of those who fear nuclear proliferation is the possibility of terrorists stealing fissionable material from reactors and blackmailing people and governments with threat of a nuclear attack. A fine expose of how this might happen is given by Mason Willrich and T. Taylor, Nuclear Theft: Risks and Safeguards (Cambridge MA Ballinger, 1974), p. 3.

**APPENDICES**

APPENDIX I

TREATY ON THE NON-PROLIFERATION OF  
NUCLEAR WEAPONS

Signed at Washington, London, Moscow, July 1, 1968

U. S. ratification deposited March 5, 1970

Entered into force March 5, 1970

The States concluding this Treaty, hereinafter referred to as the "Parties to the Treaty",

Considering the devastation that would be visited upon all mankind by a nuclear war and the consequent need to make every effort to avert the danger of such a war and to take measures to safeguard the security of peoples,

Believing that the proliferation of nuclear weapons would seriously enhance the danger of nuclear war,

In conformity with resolutions of the United Nations General Assembly calling for the conclusion of an agreement on the prevention of wider dissemination of nuclear weapons,

Undertaking to cooperate in facilitating the application of International Atomic Energy Agency safeguards on peaceful nuclear activities,

Expressing their support for research, development and other efforts to further the application, within the framework of the International Atomic Energy Agency safeguards system, of the principle of safeguarding effectively the flow of source and special fissionable materials by use of instruments and other techniques at certain strategic points,

Affirming the principle that the benefits of peaceful applications of nuclear technology, including any technological byproducts which may be derived by nuclear-weapon States from the development of nuclear explosive devices, should be available for peaceful purposes to all Parties to the Treaty, whether nuclear weapon or non-nuclear weapon States,

Convinced that, in furtherance of this principle, all Parties to the Treaty are entitled to participate in the fullest possible exchange of scientific information for, and to contribute alone or in cooperation with other States to, the further development of the applications of atomic energy for peaceful purposes,

Declaring their intention to achieve at the earliest possible date the cessation of the nuclear arms race and to undertake effective measures in the direction of nuclear disarmament,

Urging the cooperation of all States in the attainment of this objective,

Recalling the determination expressed by the Parties to the 1963 Treaty banning nuclear weapon tests in the atmosphere in outer space and under water in its Preamble to seek to achieve the discontinuance of all test explosions of nuclear weapons for all time and to continue negotiations to this end,

Desiring to further the easing of international tension and the strengthening of trust between States in order to facilitate the cessation of the manufacture of nuclear weapons, the liquidation of all their existing stockpiles, and the elimination from national arsenals of nuclear weapons and the means of their delivery pursuant to a treaty on general and complete disarmament under strict



and effective international control,

Recalling that, in accordance with the Charter of the United Nations, States must refrain in their international relations from the threat or use of force against the territorial integrity or political independence of any State, or in any other manner inconsistent with the Purposes of the United Nations, and that the establishment and maintenance of international peace and security are to be promoted with the least diversion for armaments of the world's human and economic resources,

Have agreed as follows:

#### ARTICLE I

Each nuclear-weapon State Party to the Treaty undertakes not to transfer to any recipient whatsoever nuclear weapons or other nuclear explosive devices or control over such weapons or explosive devices directly, or indirectly; and not in any way to assist, encourage, or induce any non-nuclear-weapon State to manufacture or otherwise acquire nuclear weapons or other nuclear explosive devices, or control over such weapons or explosive devices.

#### ARTICLE II

Each non-nuclear-weapon State Party to the Treaty undertakes not to receive the transfer from any transferor whatsoever of nuclear weapons or other nuclear explosive devices or of control over such weapons or explosive devices directly, or indirectly; not to manufacture or otherwise acquire nuclear weapons or other nuclear explosive devices; and not to seek or receive any assistance

in the manufacture of nuclear weapons or other nuclear explosive devices.

### ARTICLE III

1. Each non-nuclear weapon State Party to the Treaty undertakes to accept safeguards, as set forth in an agreement to be negotiated and concluded with the international Atomic Energy Agency in accordance with the Statute of the international Atomic Energy Agency and the Agency's safeguards system, for the exclusive purpose of verification of the fulfilment of its obligations assumed under this Treaty with a view to preventing diversion of nuclear energy from peaceful uses to nuclear weapons or other nuclear explosive devices. Procedures for the safeguards required by this article shall be followed with respect to source or special fissionable material whether it is being produced, processed or used in any principal nuclear facility or is outside any such facility. The safeguards required by this article shall be applied on all source or special fissionable material in all peaceful nuclear activities within the territory of such State, under its jurisdiction, or carried out under its control anywhere.

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

3. The safeguards required by this article shall be implemented in a manner designed to comply with article IV of this Treaty, and to avoid hampering the economic or technological development of the Parties or international cooperation in the field of peaceful nuclear activities, including the international exchange of nuclear material and equipment for the processing, use or production of nuclear material for peaceful purposes in accordance with the provisions of this article and the principle of safeguarding set forth in the Preamble of the Treaty.

4. Non-nuclear-weapon States Party to the Treaty shall conclude agreements with the International Atomic Energy Agency to meet the requirements of this article either individually or together with other States in accordance with the Statute of the International Atomic Energy Agency. Negotiation of such agreements shall commence within 180 days from the original entry into force of this Treaty. For States depositing their instruments of ratification or accession after the 180-day period, negotiation of such agreements shall commence not later than the date of such deposit. Such agreements shall enter into force not later than eighteen months after the date of initiation of negotiations.

#### ARTICLE IV

1. Nothing in this Treaty shall be interpreted as affecting the inalienable right of all the Parties to the Treaty to develop research, production and use of nuclear energy for peaceful purposes without discrimination and in conformity with articles I and

and II of this Treaty.

2. All the Parties to the Treaty undertake to facilitate, and have the right to participate in, the fullest possible exchange of equipment, materials and scientific and technological information for the peaceful uses of nuclear energy. Parties to the Treaty in a position to do so shall also cooperate in contributing alone or together with other States or international organizations to the further development of the applications of nuclear energy for peaceful purposes, especially in the territories of non-nuclear-weapon States Party to the Treaty, with due consideration for the needs of the developing areas of the world.

#### ARTICLE V

Each Party to the Treaty undertakes to take appropriate measures to ensure that, in accordance with this Treaty, under appropriate international observation and through appropriate international procedures, potential benefits from any peaceful applications of nuclear explosions will be made available to non-nuclear-weapon States Party to the Treaty on a non-discriminatory basis and that the charge to such Parties for the explosive devices used will be as low as possible and exclude any charge for research and development. Non-nuclear-weapon States Party to the Treaty shall be able to obtain such benefits, pursuant to a special international agreement or agreements, through an appropriate international body with adequate representation of non-nuclear-weapon States. Negotiations on this subject shall commence as soon as possible after the Treaty enters into force. Non-nuclear-weapon

States Party to the Treaty so desiring may also obtain such benefits pursuant to bilateral agreements.

#### ARTICLE VI

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

#### ARTICLE VII

Nothing in this Treaty affects the right of any group of States to conclude regional treaties in order to assure the total absence of nuclear weapons in their respective territories.

#### ARTICLE VIII

1. Any Party to the Treaty may propose amendments to this Treaty. The text of any proposed amendment shall be submitted to the Depositary Governments which shall circulate it to all Parties to the Treaty. Thereupon, if requested to do so by one-third or more of the Parties to the Treaty, the Depositary Governments shall convene a conference, to which they shall invite all the Parties to the Treaty, to consider such an amendment.

2. Any amendment to this Treaty must be approved by a majority of the votes of all the Parties to the Treaty, including the votes of all nuclear-weapon States Party to the Treaty and all other Parties which, on the date the amendment is circulated, are members of the Board of Governors of the International Atomic

Energy Agency. The amendment shall enter into force for each Party that deposits its instrument of ratification of the amendment upon the deposit of such instruments of ratification by a majority of all the Parties, including the instruments of ratification of all nuclear-weapon States Party to the Treaty and all other Parties which, on the date the amendment is circulated, are members of the Board of Governors of the International Atomic Energy Agency. Thereafter, it shall enter into force for any other Party upon the deposit of its instrument of ratification of the amendment.

3. Five years after the entry into force of this Treaty, a conference of Parties to the Treaty shall be held in Geneva, Switzerland, in order to review the operation of this Treaty with a view to assuring that the purposes of the Preamble and the provisions of the Treaty are being realized. At intervals of five years thereafter, a majority of the Parties to the Treaty may obtain, by submitting a proposal to this effect to the Depositary Governments, the convening of further conferences with the same objective of reviewing the operation of the Treaty.

#### ARTICLE IX

1. This Treaty shall be open to all States for signature. Any State which does not sign the Treaty before its entry into force in accordance with paragraph 3 of this article may accede to it at any time.

2. This Treaty shall be subject to ratification by signatory States. Instruments of ratification and instruments of

accession shall be deposited with the Governments of the United States of America, the United Kingdom of Great Britain and Northern Ireland and the Union of Soviet Socialist Republics, which are hereby designated the Depositary Governments.

3. This Treaty shall enter into force after its ratification by the States, the Governments of which are designated Depositories of the Treaty, and forty other States signatory to this Treaty, and the deposit of their instruments of ratification. For the purposes of this Treaty, a nuclear-weapon State is one which has manufactured and exploded a nuclear weapon or other nuclear explosive device prior to January 1, 1967.

4. For States whose instruments of ratification or accession are deposited subsequent to the entry into force of this Treaty, it shall enter into force on the date of the deposit of their instruments of ratification or accession.

5. The Depositary Governments shall promptly inform all signatory and acceding States of the date of each signature, the date of deposit of each instrument of ratification or of accession, the date of the entry into force of this Treaty, and the date of receipt of any requests for convening a conference or other notices.

6. This Treaty shall be registered by the Depositary Governments pursuant to article 102 of the Charter of the United Nations.

#### ARTICLE X

1. Each Party shall in exercising its national sovereignty have the right to withdraw from the Treaty if it decides that extra-

ordinary events, related to the subject matter of this Treaty, have jeopardized the supreme interests of its country. It shall give notice of such withdrawal to all other Parties to the Treaty and to the United Nations Security Council three months in advance. Such notice shall include a statement of the extraordinary events it regards as having jeopardized its supreme interests.

2. Twenty-five years after the entry into force of the Treaty, a conference shall be convened to decide whether the Treaty shall continue in force indefinitely, or shall be extended for an additional fixed period or periods. This decision shall be taken by a majority of the Parties to the Treaty.

#### ARTICLE XI

This Treaty, the English, Russian, French, Spanish and Chinese texts of which are equally authentic, shall be deposited in the archives of the Depositary Governments. Duly certified copies of this Treaty shall be transmitted by the Depositary Governments to the Governments of the signatory and acceding States.



APPENDIX II

STATUS OF THE NPT  
(Review Conference participants in Italics)

PARTIES (96)

(58 present, one as observer)

Afghanistan%	<u>Gabon%</u>	Lesotho@	Rwanda
<u>Australia</u> @	Gambia	<u>Liberia</u>	<u>San Marino</u>
<u>Austria</u> @	<u>Germany (East)</u> @	Libya	<u>Senegal</u>
Bahamas	<u>Germany (West)</u> %	<u>Luxembourg</u> %	Sierra Leone
<u>Belgium</u>	<u>Ghana</u> @	Malagasy	Somalia
<u>Bolivia</u> %	<u>Greece</u> @ (prov)	Republic@	<u>Sudan</u> %
Botswana	Grenada	Malaysia@	Swaziland@
<u>Bulgaria</u> @	Guatemala	Maldiv Islands	<u>Sweden</u> @
Burundi	Haiti%	Mali	<u>Syrian Arab</u>
Cameroon	Holy See@	Malta	<u>Republic</u>
<u>Canada</u> @	<u>Honduras</u> %	<u>Mauritius</u> @	Taiwan
Central African	<u>Hungary</u> @	<u>Mexico</u> @	<u>Thailand</u> @
Republic	<u>Iceland</u> @	<u>Mongolia</u> @	Togo
Chad	<u>Iran</u> @	<u>Morocco</u> @	Tonga %
Costa Rica %	<u>Iraq</u> @ (observer)	<u>Nepal</u> @	<u>Tunisia</u>
<u>Cyprus</u> @	<u>Ireland</u> @	<u>Netherlands</u> %	<u>Union of Soviet</u>
<u>Czechoslovakia</u> @	<u>Italy</u> %	<u>New Zealand</u> @	<u>Socialist Republics</u>
Dahomey	Ivory Coast	<u>Nicaragua</u> %	<u>United Kingdom</u> *
<u>Denmark</u> @	<u>Jamaica</u>	<u>Nigeria</u>	<u>United States</u> *
Dominican	<u>Jordan</u> %	<u>Norway</u> @	Upper Volta

Republic @	Kenya	Paraguay	<u>Uruguay</u> %
<u>Ecuador</u> @	Khmer Republic	<u>Peru</u>	Vietnam (South) @
El Salvador %	<u>Korea (South)</u>	<u>Philippines</u> @	Western Samoa
<u>Ethiopia</u>	Laos	<u>Poland</u> @	<u>Yugoslavia</u> @
<u>Fiji</u> @	<u>Lebanon</u> @	<u>Romania</u> @	<u>Zaire</u> @
<u>Finland</u> @			

\* Nuclear weapon state

@ IAEA Safeguards Agreements in force as required by the NPT.

% IAEA Safeguards Agreements signed or approved by the Board of Governors

#### SIGNATORIES (15)

(7 present)

Barbados %	Kuwait	<u>Trinidad</u> %	Yemen, Arab
Colombia	<u>Panama</u>	<u>Tobago</u>	Republic of
<u>Egypt</u>	Singapore	<u>Turkey</u>	Yemen,
Indonesia	Sri Lanka	<u>Venezuela</u>	Democratic
<u>Japan</u> %	<u>Switzerland</u>		Republic

#### NON-SIGNATORIES (39)

(7 present as observers)

Albania	<u>Cuba</u>	Korea (North)	Rhodesia
<u>Algeria</u>	Equatorial	Malawi	Saudi Arabia
<u>Argentina</u>	Guinea	Mauritania	<u>South Africa</u>

Bahrain	France *	Monaco	<u>Spain</u>
Bangladesh	Guinea	Nauru	Tanzania
Bhutan	Guinea-Bissau	Niger	Uganda
<u>Brazil</u>	Guyana	Oman	United Arab
Burma	India @	Pakistan	Emirates
Chile	<u>Israel</u>	Portugal	Vietnam (North)
China*	<u>Liechtenstein</u>	Oatar	Zambia
Congo			

\* Nuclear weapon state

% IAEA Safeguards Agreements signed or approved  
by the Board of Governors.

@ India has detonated a "peaceful nuclear device."

Source: Arms Control Association, Arms Control Today,  
vol. 5, no. 6, June, 1975.

**BIBLIOGRAPHY**

## BIBLIOGRAPHY

### Documents

Documents on Disarmament, 1968 and 1971 (Arms Control and Disarmament Agency, Washington, D.C.)

Eighteen Nation Disarmament Committee Document - ENDC/PV. 389 (U. N., New York).

United Nations Document A/C.I/SR.760 (U.N., New York).

U. N. General Assembly Consideration of the IAEA Report,  
November 1, 1972.

Report of the Department of Atomic Energy for the Year 1957-58  
(Government of India Publication, New Delhi).

Lok Sabha Debates, Government of India Publications - 1964  
(New Delhi)

Parliamentary Debates, 4th Series, vol. 37, no. 15, 1970.

Annual Reports of the Atomic Energy Commission, Government  
of India, 1970 to 1976 (New Delhi)

15th Annual Report to the Congress Publication 88. July 29,  
1976 (A.C.D.A. - Washington, D.C.)

Documents of the IAEA, Austria, 1965 (Reprinted)

Report of the IAEA, 1968-69 (Vienna)

Market Survey for Nuclear Power in the Developing Countries,  
1974. IAEA Agency, Vienna.

IAEA Report, 1975: Nuclear Power Planning Study for Pakistan  
(Vienna)

### Newspapers

Guardian Weekly (London), August 15, 1976.

Link, September 21, 1975.

India Today, December 1-15, 1977 (New Delhi)

Indian Express, January 6, 1975.

Jen-min Jih-pao, January 23, 1968, New China News Agency.

Jen-min Jih-pao, May 12, 1966, New China News Agency.

Peking Review, no. 29, 1962.

Peking Review, no. 31, 1963.

Times of India, May 19, June 1, December 23, 1974.

The Times, January 15, 1968, London.

Times of India, June 22, 1977.

Times of India, January 3, 5, 6, 1978.

New York Times, January 4, 6, 1975 and November 17, 1975.

#### Technical-Nuclear

Comey, D. D., "Do not go gentle into that Radiation Zone",  
Bulletin of Atomic Scientists, November 1975,  
pp. 45-47.

McIntyre, H. C., "Natural Uranium Heavy Water Reactors",  
Scientific American, October 1975, pp. 17-27.

#### Operations Research

ACDA/WEC - 98. June 30, 1967. The Control of Local Conflict,  
A Design Study on Arms Control and Limited Wars in  
the Developing Areas. vol. III.

The Analysis of Options: A Computer Aided Method of Answering  
Political Problems. ACDA/ST-1492 (Management  
Science Centre, University of Pennsylvania).

Alexander, Joyce M., "An Operations Research Approach to  
Conflict Resolution", Seminar on Conflict Resolution,  
1975 (Department of State, Washington, D.C.)

Chari, V. V., "Systems Analysis of Strategic Defence Needs",  
Economic and Political Weekly, February 1969.

Dresher, Melvin, Games of Strategy: Theory and Application  
(Prentice Hall, N.J., Englewood Cliffs, 1961).

Hans Speir, "Some Observations on Political Gaming",  
World Politics, vol. 12, 1959.

Harsanyi, J. C., "A General Theory of Rational Behaviour in  
Game Situations", Econometrica, March 1964.

Howard, N., Paradoxes of Rationality. Th. of Metagames and Pol. beh. MIT Press.

Howard, Nigel, The Theory of Meta-Games, Management Science Centre, University of Pennsylvania, May 1966.

Rapoport, Anatol, Fights, Games and Debates (Ann Arbor, University of Michigan Press, 1963).

Saaty, Thomas L., Mathematical Models of Arms Control and Disarmament (New York, John Wiley & Sons, 1968).

Shurik, M. and Brewer, G. D., Models, Simulation and Games: A Survey. Hand - 1060 - ARPA/RC, May 1972 (Rand Corporation, Santa Monica, CA.)

Strategy, Arms Control, and Disarmament

✓ Aron, Raymond, "The Evolution of Modern Strategic Thought", Adelphi Papers, 54 (February 1969).

Bechhoefer B., Post War Negotiations for Arms Control. (Washington, D.C., 1961).

Brennan, D., ed., Arms Control, Disarmament and National Security (New York, 1961).

Daedalus, Winter 1960 (Cambridge, Mass.), Special Issue on Arms Control.

Daedalus, Summer 1975 (Cambridge, Mass), Issue on Arms Control.

Dougherty, J.E., ed., Arms Control for the Late Sixties (Princeton, 1967).

Edwards, D. V., Arms Control in International Politics (New York, 1961).

Epstein, W., Disarmament: Twenty-five Years Efforts. Canadian Institute of International Affairs, 1971.

Fleming, D. F., The Cold War and Its Origins (Golden City, Doubleday & Co., 1961), vols. I and II.

Gallois, Pierre, Balance of Terror (Boston, Houghton Mifflin, 1961).

Halperin, Morton and Schelling, Strategy and Arms Control (New York, 1961).

- Hewlett and Anderson, The New World: 1939-1946, vol. I  
 Pennsylvania State University Press, 1962.
- International Institute for Strategic Studies, "Arms Control",  
Strategic Survey, 1974.
- Kahn, Herman, Thinking About the Unthinkable (London, Weidenfeld  
 & Nicholas, 1962).
- Myrdal, A., "The High Price of Nuclear Arms Monopoly",  
Foreign Policy, Spring 1975.
- Neild, R. R., The Test Ban: SIPRI Research Report, 1971  
 (Stockholm)
- Quester, G. H., "Implications of SALT Outcome for Potential  
 Nth Powers: Israel, India and Others", in  
 Kintner and Pfaltzgraff, eds., SALT: Implications  
 for Arms Control in the 1970s. Penn., Pittsburgh  
 University Press.
- Smith, G. C., "SALT After Vladivostok", Journal of Interna-  
 tional Affairs. Spring 1975.
- ✓ SIPRI Year Book of Armaments and Disarmament (Stockholm),  
 1968-1975.
- SIPRI Year Book 1976. World Disarmament and World Armaments.  
 (Stockholm)
- Stanford Journal of International Studies: Arms Control, vol. 7  
 (Stanford, 1972).
- Young, Elizabeth, A Farewell to Arms Control (England, Pelican  
 Books, 1972).

### Conflict

- Kende, Istvan, "Twenty-five Years of Local War", Journal of  
 Local War", Journal of Peace Research, No. 8,  
 1971.
- Straunch, Ralph, Information and Perception in Limited  
 Strategic Conflict. Santa Monica, Rand Corp.  
 Feb. 1976, 52 pp.
- Wood, David, "Conflict in the Twentieth Century", Adelphi  
 Paper No. 48 (IISS - London)



## Non-Proliferation Treaty

Epstein W., Retrospective of the NPT Review Conference.  
Stanley Foundation Occasional Paper No. 9.

Marks, Ann W., ed., NPT : Paradoxes and Problems (Washington, D.C.: Carnegie Endowment for International Peace Arms Control Association, 1975).

"The NPT Review Conference and Nuclear Proliferation",  
Orbis, vol. 19, no. 2, Summer 1975, pp. 316-20.

Poulose, T. T., "NPT Review Conference", Foreign Affairs Report, February 1975.

Willrich M., Non-Proliferation Treaty: Framework for Nuclear Arms Control (Charlottesville, 1970).

The Near Nuclear Countries and the NPT (SIPRI, Stockholm, 1972).

## Nuclear Proliferation and Non-Proliferation

Barnaby, Frank, Nuclear Power and Proliferation: Military Significance of a Plutonium Economy is Now being Recognized. New Scientists, vol. 75, no. 1061, July 21, 1977, p. 168.

Baileau, O. C., "Can Strategic Deterrence Prevent a Nuclear War?", National Defence, vol. 61, no. 341, March-April 1977, p. 370.

Betts, Richard K, "Paranooids, Pygmies, Pariats and non-proliferation", Foreign Policy, no. 26, Spring 1977, p. 157.

Beaton, L. M., The Spread of Nuclear Weapons (London, 1962).

Buchan, A., A World of Nuclear Powers? (Englewood Cliffs, 1966).

"Carter's Nuclear Policy", US News and World Report, vol. 83, no. 1, July 4, 1977, p. 51.

Dunn, Lewis, "India, Pakistan, Iran - A Nuclear Proliferation Chain", Hudson Institute Report, HI-2407, March 21, 1976.

- Epstein, W., "Nuclear-Free Zones", Scientific American, November 1975, pp. 25-35.
- \_\_\_\_\_, The Last Chance (New York, Free Press, 1976).
- Ikle, F. C., "Can Nuclear Deterrence Last Out the Century"? Foreign Affairs, January 1973.
- Jarvenpaa, Pauli, Flexible Nuclear Options: New Myths and Old Realities (Ithaca, Cornell University Peace Research Programme - OC), Sept. 1976, p. 58.
- Maddox, John, "Prospects for Nuclear Proliferation", Adelphi Papers No. 113 (IISS - London, 1975).
- Meeker, T. A., comp., The Proliferation of Nuclear Weapons and the Non-Proliferation Treaty. A Selected Bibliography and Source List. Political Issues Series. Los Angeles: Centre for the Study of Armament and Disarmament, 1975.
- Nuclear Proliferation Problems. Stockholm, SIPHI, 1974.
- Nelson, G., "Nuclear Proliferation: A Growing Danger", Congressional Record, 11 November 1975. S 19638-41
- Pigre Andrew and Caudla Moyne, Nuclear Proliferation: A Strategy for Control (New York, Foreign Policy Association, Headline Series No. 232, Oct. 1976)
- Quester, G. H., Nuclear Diplomacy: The First Twenty-five Years (New York, 1970).
- Sandoval, Robert R., "Consider the Porcupine: Another View of Nuclear Proliferation", Bulletin of Atomic Scientist, May 1976.
- SIPHI - 1975. Preventing Nuclear Proliferation. (MIT Press, Mass.)
- Steinberg, Meyer, "Nuclear Power Without Nuclear Bombs", New Scientist, vol. 75, no. 1059, July 7, 1977, pp. 14-16.
- "Frightening Rise in Third World Nuclear Power", editorial. Vikrant Asia's Defence Journal, vol. 7, no. 10, July 1977.

Middle East

IDSA Review on Science and Technology, Middle East, no. 16, February 1976.

Sepehr, Zabih, "Iran Today", Current History, February 1974.

Pakistan

Beri, H. M. L., "Pakistan and CENTO", Strategic Analysis, vol. 1, no. 3, June 1977, pp. 54-62.

Baid and Sreedhar, "Pakistan's Defence Potential", Far Eastern Review, April 1976.

Syed, Anwar H., "Pakistan's Security Problems: A Bill of Constraints", Orbis, vol. XIV, no. 4, Winter 1973.

Zalmy Khalilzad, "Pakistan: The Making of a Nuclear Power", Asian Survey (Berkeley, Calif.), vol. 16, January 1976.

India

Anand, J. P., "India and Her Neighbours", Strategic Analysis (IDSA - New Delhi), vol. 1, no. 7, October 1977.

Chopra, M., "India's Advance in the Nuclear Field", Aussen Politik (English Version), 3/1975, pp. 354-8.

Bray, F. J., and Modie, M., "Nuclear Politics in India", Survival (IISS - London), May and June 1977.

Kapur, Ashok, "India and the Atom", Bulletin of the Atomic Scientists (September 1974).

✓ Kaushik, B. M., "India's Nuclear Policy: Factors Responsible for the Change", Foreign News and Features, vol. 8, no. 30, 23 July 1977, p. 5.

Jain, J. P., Nuclear India, vol. II (Delhi, Radiant Publishers, 1974).

\_\_\_\_\_, India and Disarmament: Nehru Era (Delhi, Radiant Publisher, 1974).

Mirchandani, G. G., India's Nuclear Dilemma (Delhi, Popular Book Service, 1968).

Pierr M. Gallios, "Indian Nuclear Experiment and India's Security", Foreign Affairs Reports (New Delhi), June 1975.

✓ Raghavan, C., "India's Nuclear Policy: Mainstream White Paper", Mainstream, 6 August 1977, p. 33.

- Rajan, M. S., "India: A Case of Power Without Force",  
International Journal, vol. 30, no. 2, Spring 1975.
- Bhabani Sen Gupta, "How Close is India to the Bomb"? in  
Geoffrey Kemp, R. L. Pfaltzgraff and Uri Ra'an, eds.,  
The Super Powers in a Multinuclear World (Lexington, 1974)
- Williams, Shelton L., The U.S., India and the Bomb (Baltimore,  
J. H. Press, 1969).

#### International System

- Rosenau, J., ed., International Politics and Foreign Policy  
(New York, Free Press, 1969).
- Knorr and Verba, The International System: Theoretical Essays  
(Princeton University Press, 1961).