FROM INDEPENDENCE TO THE BOMB: INDIA'S NUCLEAR MOTIVATIONS 1945 - 1974

by

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A truly politically independent India, already in the process of economic modernization, would significantly benefit from an independent, non-safeguarded nuclear weapons capability, even if never actually weaponized. The mere potential would reflect favorably on the nation's political status in Asia and the world. In India's case, purely military motivations came last. The border clashes with China in the early 1960s created national antagonisms that began to unravel Nehru's other vision of the two neighboring "sisters" cooperating in each others maturation as newly independent countries. But it was China's detonation of a nuclear device in 1964 that set up the political (and subordinate military) motivations for India itself to go nuclear ten years later. Military factors played a critical role in the mid- to late 1960s and early 1970s, separated by a generation from Nehru's original economic vision but reinforcing a subsequent Nehru initiative toward nuclear independence and a nuclear weapons capability totally in isolation from an immediate external military threat.

ABSTRACT

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Every nation seeking to acquire nuclear weapons capabilities experiences a mixture of motivations. Although one may predominate as the agent of catalyst -- typically a national security factor, except in India -- others appear almost simultaneously or soon after to reinforce the initial motivator. Because of the multiple milestones that every proliferant nation must confront, there are multiple decision points for proceeding. At each milestone, a mixture of motivations affects the decision, interacting with each other, each with its own constituency of supporters and players. In India, economic factors played a key role in the formative stages of the national nuclear effort, guided by Nehru's vision of an economically developed, nuclear-powered India. Political factors, especially India's self-image and its role in the region and the world, began to take on greater significance. Indeed, political considerations increased because of the availability of nuclear technology and assistance from the United States and other western nations under the Baruch Plan and the Atoms for Peace program in the late 1940s and 1950s. India rebelled as much against its implied subordination as a "have-not" nation seeking handouts from the "haves" as it did against Britain in its path to political independence.

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CHAPTER I

KEY ISSUES FOR NUCLEAR MOTIVATIONS ANALYSIS

> We waited until the blast had passed, walked out of the shelter and then it was extremely solemn.... Now I am become death, the destroyer of worlds. (Quoted from Indian Hindu scripture after witnessing the first nuclear explosion).
>
> J. Robert Oppenheimer, Trinity Test Site, 16 July 1945

Why did India consider it necessary to choose the nuclear weapons option? What restrained its nuclear program in the face of competitive nuclear developments in the People's Republic of China (PRC) and Pakistan in the 1960s and 1970s? How does a democratic India view the U.S. role in classifying and trying to restrict India's nuclear program as "proliferation," while striving to engage a communist China? What continues to motivate India in its longstanding attempts at a strategic role in world politics? In asking these questions, a bottom-up study of India offers a distinctive example of why nuclear options will remain a global concern and why an in-depth analysis of country-specific motivations is absolutely essential.

There is broad interest within the international community and the United States national security community in the motivations and intentions of states seeking nuclear weapons. Greater understanding of motivations is important because of the continuing proliferation of nuclear weapons technology and its significant impact on nonproliferation policy formulation and counterproliferation considerations. Yet, there is

a marked lack of in-depth analysis in the area of motivations, a critical part of intentions. The small number of motivation studies done to date understates the potential value of a more in-depth approach to why nations seek nuclear weapons. Much of the published work does not deal comprehensively with the wide range of motivations, nor does it address the dynamic interrelationships of motivations arising within a state or as a result of interstate competition. In addition, once a country has developed a nuclear science and technology (S&T) capability and exercised its nuclear weapons option, the momentum of technology often dictates continuing improvements. As such, the original motivations to acquire nuclear weapons may be reinforced or they may be significantly modified by considerations of stockpiling or operationally deploying nuclear weapons.

MOTIVATIONS ANALYSIS

Current studies deal with national motivations only in generalities. That is, they take a top-down approach, establishing a very limited number of potential factors (especially concern for national security, a desire for prestige and regional leadership, and a few others), which are then applied to various countries. This approach has serious limitations because it does not take into consideration the much broader range of country-specific factors that influence the behavior of individual nations. This approach also suffers from oversimplification because of its emphasis on security-related issues. For example, economic motivators are seldom if ever addressed, nor is there any sense of the

interaction of military, political, and economic influences on any particular nation's decision making to acquire a nuclear weapons capability.[1]

A bottom-up, country-specific approach, taking account of these additional considerations, would focus much needed emphasis on the key issue of the *dynamic interaction* of motivations.[2] For example, the decision to acquire nuclear weapons necessarily involves a complex interrelationship of influences from multiple political, economic, and military interests. Every nation attempting to acquire a complete weapon system or to develop a nuclear weapons capability of its own passes through a series of milestones, each requiring a decision to go ahead or not. At each milestone, different communities of interest--military officers, political officials, and defense industries leaders--each influence decisions with its own constituency of supporters. The dynamic interaction of these competing interests has a significant effect on the shape and timing of the final decision. Although a deep concern for national security is almost always the catalyst for the initial decision to proceed along the nuclear path, political and economic considerations gain strength at each succeeding milestone. Ultimately, each plays a major role in the decision making process. Considerations from each area may be rejected, subordinated, or elevated while working toward a common goal.

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[1] The most important of these studies are indicated later in this section. One study stands out as a *country-specific* example of motivational analysis, see Laurie S. Eliasson, Major, USAFR, *The Islamic Bomb. Pakistan's Motivations in its Quest for a Nuclear Weapons Option*, MSSI Thesis (Washington, DC: Joint Military Intelligence College, August 1996). See also, Ronald A. Robinette, ISC, USNR, *Malaysia, Indonesia and the Nuclear Weapons Option: A Study of Motivations*, MSSI Thesis (Washington, DC: Joint Military Intelligence College, August 2000).

[2] (b)(3):10 USC 424 Colonel, USAFR (Ret.), Associate Dean for College Part-Time Programs, Joint Military Intelligence College, Washington, DC, and former senior analyst at the Defense Intelligence Agency, interviews by the author, September 1999-August 2000. (b)(3):10 USC is a pioneer in multi-motivational analysis of nuclear weapons acquisition and a strong advocate of the bottom-up, country-specific approach.

This country-specific perspective on the decision making process and the motivations driving countries seeking nuclear weapons must be understood and addressed if any international nonproliferation policy is to succeed. The critical *dynamic interaction* of motivations, readily apparent only in a bottom-up analysis, offers a more comprehensive view of why a country would seek a nuclear option, over any top-down security framework analysis.

Ideally, a bottom-up motivation analysis could help identify broad areas of intentions. Such analysis could reinforce the direction of any capabilities study done during the materials acquisition or signature construction phases. Such a study could also serve to uncover program development intentions in countries not previously identified as seeking a weapons program.

Capabilities, Intentions, and Will

While the U.S. Intelligence Community has three deliverables, current analysis typically emphasizes *capabilities* at the expense of the admittedly more difficult *intentions* and *will*. Thus, any comprehensive study of states seeking nuclear weapons technology demands a more balanced approach involving all three deliverables to confront proliferation concerns. In the case of motivations, much analysis centers exclusively on the initial national security reasons for acquisition of nuclear weapons, exclusive of any distinctive cultural and psychological complexity of individual countries and policymakers. The motivations are typically simplified and linked to overriding security concerns. That overall security determination often fails to account for the important range of country-specific motivations driving acquisition of nuclear weapons

technology. In effect, "current analysis of nuclear motivations tends to emphasize first-order causes especially the initial motivation for acquiring a nuclear weapons capability."[3]

The paradox of nuclear weapons and the interrelationship of motivations on multiple levels are reflected in the very nature of the technology. For example, while overt pride in nuclear technology prowess is touted as a matter of national prestige, it is only a secondary motivation due to the practical requirement to keep any developing clandestine nuclear weapons program secret. The inherent duality of commercial nuclear reactor technology reinforces the perceived essential security traditionally associated with nuclear weapons programs. While such secrecy often impedes much needed independent academic or scientific study and nonproliferation efforts, it is seen as a traditional and necessarily ambiguous part of nuclear weapons technology.

Current Analysis

Acquiring nuclear weapons capability tends to be attributed to first-order causes in current analysis, especially for the initial motivation. However, some studies have emphasized non-military motivations as primary determinants. For example, in its 1977 report *Nuclear Proliferation and Safeguards*, the Office of Technology Assessment (OTA) contended,

> The technical and economic barriers to proliferation are declining as accessibility to nuclear weapon material becomes more widespread. Consequently, the decision whether or not to acquire a nuclear weapon capability has become

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[3] Eliasson, 1-2.

> increasingly a *political* one. The choice will turn on whether a nation views the possession of such a capability as being, on balance, in its national interest.[4]

According to the latest OTA report, *Proliferation of Weapons of Mass Destruction: Assessing the Risks*, the appeal of nuclear weapons may lie in their *perceived value*. Countries see such weapons as a symbol of international status, national pride, or associated with the great power status of the five nations of the United Nations Security Council. The perceived exclusiveness is reinforced by all of the permanent members being declared nuclear powers. In addition, nuclear weapons are valued for their deterrent value, perceived military utility, or for S&T and industrial economic benefits. In effect, the continuity between the 1977 and 1993 reports led the OTA to the "conclusion that, in the long run, motivations are key still holds true."[5] However, any in-depth analysis of the interaction of motivations is noticeably lacking.

A promising approach to the study of nuclear motivations is in the country-specific examination of the "strategic personality" of states the United States seeks to deter. One example is Paula DeSutter's *Denial and Jeopardy: Deterring Iranian Use of NBC Weapons*, where considerations of political, military, and economic incentives to proliferate are emphasized. These include seeking political tools to change the regional status quo, for coercion, and for undermining courses of action for coalition warfare. Military incentives include acquiring the capability of changing the conduct of the war through the threat of use (or actual use), and using nuclear capable systems (like mobile

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[4] U.S. Congress, Office of Technology Assessment, *Nuclear Proliferation and Safeguards* (Washington, DC: GPO, 1977), 11. Emphasis added.

[5] U.S. Congress, Office of Technology Assessment, *Proliferation of Weapons of Mass Destruction: Assessing the Risks* (Washington, DC: GPO, 1993), 99.

missiles) not only for their psychological threat value but also to draw enemy forces away from other targets. Economic incentives include capital or barter for other weaponry, indigenous production to avoid the consequences of export controls, spin-off benefits, and extracting money from the western nations. According to DeSutter, "deterrence strategies must be tailored to the strategic calculations those states are likely to make and the national context within which decisions will be made."[6] Still, this broad motivational concept remains in its infancy.

According to the National Defense University's *Strategic Assessment 1999*, key nonproliferation trends include the growing community of U.S.-led *market democracies*. While specific motivations are not discussed, indications of such forces are addressed as goals of identified key transition states, Russia, China, and India.

> They are pursuing foreign policies anchored in state interests and seek to establish themselves as leading powers.... Each seeks a revision of the status quo that will increase its influence at the expense of the U.S. Only China has the potential to become a global power but Russia and India will remain regionally influential.[7]

The significant impact of economic considerations on the dynamic interaction of motivations is evident in current analysis of China. According to George Tenet, Director Central Intelligence, for China "the question remains open whether, in the long run, a market economy and an authoritarian regime can co-exist successfully."[8]

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[6] Paula DeSutter, "Denial and Jeopardy: Deterring Iranian Use of NBC Weapons," online edition (Washington, DC: National Defense University Press, September 1997), URL: <http://www.ndu.edu/inss/books/dajd/cont.html>. Accessed 30 July 2000.

[7] National Defense University, Institute for National Strategic Studies, *Strategic Assessment 1999 Priorities for a Turbulent World* (Washington, DC: GPO, 1999), xiv.

[8] George J. Tenet, "The Worldwide Threat in 2000: Global Realities of our National Security," DCI statement before the Senate Select Committee on Intelligence, 2 February 2000, URL: <www.cia.gov/cia/publicaffairs/speeches/dcispeech_020200.html>. Accessed 15 May 2000.

Evidence of Motivations from Open Sources

By themselves, open source information, professional literature, and published analysis of India's nuclear motivations are not sufficient to fully satisfy all U.S. national security and counterproliferation policy analytical requirements. However, these sources do provide insight into specific nuclear motivations from the original language of key Indian policymakers and nuclear decision makers. Traditionally, as a remnant of British colonialism and India's aversion to militarism, the military has been specifically excluded from the nuclear decision process and thus played only a minor role in early nuclear decision-making process. There was no formal connection between the defense establishment and India's nuclear program.[9] However, speculation about India's political nuclear motivations includes projected requisite military involvement in working out doctrine and conveying the "deterrent capability with a certain amount of credibility. A more visible role of the military would convey precisely such a credibility."[10] If the Indian military were assigned that responsibility by policymakers. open sources, including military journals, would likely reflect a commensurate emphasis on their joint observations on how best to achieve such credibility.

In one example of original language analysis for motivations, Jawaharlal Nehru made a significant comment on the military application of nuclear weapons on 26 June 1946 just prior to Indian independence.

As long as the world is constituted as it is, every country will have to devise and

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[9] M. A. Zafar Shah, *India and the Superpowers India's Political Relations with the Superpowers in the 1970s* (New Delhi: Vikas Publishing House, 1983), 95.

[10] W. P. S. Sidhu, "India's Nuclear Tests. Technical and Military Imperatives," *Jane's Intelligence Review* 8, no. 4 (April 1996): 172.

> use the latest scientific devices for its protection. I have no doubt India will develop her scientific researches and I hope Indian scientists will use the atomic force for constructive purposes. But if India is threatened she will inevitably try to defend herself by all means at her disposal. I hope India in common with other countries will prevent the use of atomic bombs.[11]

These remarks help establish early economic, S&T, moral, and political motivations. According to George Perkovich, Nehru's vision was crucial even before he became prime minister: "the key representative of India's identity and norms has always been the prime minister. This means that his or her personal beliefs and rhetoric about nuclear weapons have mattered enormously."[12]

Albeit evolved over a period of time, India's early moral aversion to nuclear weapons sharply contrasts with the now perceived more influential power and appeal of nuclear weapons. In the case of bordering Pakistan, characterized by a powerful militant religious right, India faces a potential foe that developed nuclear weapons "principally to meet the threat from India's conventional military superiority ... as well as to counter more subtle forms of Indian dominance in regional affairs."[13] India is concerned that Pakistan, condoning armed infiltrators into Kashmir, appears bolstered by nuclear weapons. The motivation to acquire nuclear weapons as a perceived omnipotent deterrent is evidenced by the original language of now deposed Pakistani Prime Minister

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[11] *Nehru: The First 60 Years*, vol. 2, ed. Dorothy Newman (New York: John Day, 1965), 264.

[12] George Perkovich, *India's Nuclear Bomb: The Impact on Global Proliferation* (Berkeley, California: University of California Press, 1999), 449.

[13] Leonard S. Spector and Jacqueline R. Smith, *Nuclear Ambitions: The Spread of Nuclear Weapons 1989-1990* (Boulder, Colorado: Westview Press, 1990), 95.

Nawaz Sharif. He proclaimed on the first anniversary of Pakistan's nuclear tests, "I wanted to please Allah and not the world. Pakistan is now invincible."[14]

As a precautionary note, content analysis, whether of western or Indian sources, is beset by bias and rhetoric and remains subject to subjective interpretation. According to Stephen Cohen, an analyst at the Brookings Institute, "The leadership on both sides, especially in India, has only the vaguest notion of the relationship between doctrine, strategy, and public bragging."[15] However, content analysis does provide useful insights.

Although it is outside the scope of this thesis, India's recent reactions to Pakistani nuclear initiatives indicate the value of motivations analysis. Current Intelligence Community assessments as reported by the American press surprisingly put Pakistan ahead in numbers of nuclear weapons warheads and delivery capabilities, although any analysis of the motivations driving such changes is lacking.[16] *The Times of India* and *Indian Express*, two of India's most influential newspapers, carried the story on their front pages. Indeed, India's Hindu fundamentalist Bharatiya Janata Party and the coalition government of Prime Minister Atal Behari Vajpayee owe some of their popularity to his decision to test nuclear warheads in 1998. Politically, the growing pro-nuclear lobby gained influence, apparently reversing policy and openly declaring nuclear weapons a part of the country's arsenal. Raminder Singh Jassal, spokesman for the

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[14] Ahmed Rashid and Sadanand Dhume, "Dangerous Game," *Far Eastern Economic Review* 162, no. 23 (10 June 1999), 18-20.

[15] Jane Perlez, "U.S. and India, Trying to Reconcile, Hit Bump," *New York Times*, 22 March 2000, Final Ed., A1.

[16] Robert Windrem and Tammy Kupperman, "Pakistan Nukes Outstrip India's, Officials Say: U.S. Reverses Assessment of South Asia Nuclear Balance," MSNBC News, 6 June 2000, URL: <http://www.msnbc.com/news/417106.asp>. Accessed 7 June 2000.

Indian Ministry of External Affairs, responding to the U.S. press account, stated, "The government of India is alert to developments relating to the country's security. Our credible minimum deterrent nuclear policy is based on an assessment of our security requirements and is not country specific."[17]

CONCLUSION

Open source information allows a broad-spectrum examination of nuclear motivations. Thus, this thesis will address a range of motivations that have led India from independence in 1947 to its first bomb in 1974, with brief comments on implications and repercussions for the 1998 tests and the future. While India's nuclear program remains secret, that clandestine effort involved the Prime Minister's tacit approval of scant economic, political, and S&T resources in an attempt to elevate India in the international hierarchy. Chapter 2 addresses the early years of India's nuclear program, dominated by a strong economic motivation for nuclear power. Chapter 3 addresses India's decision for the bomb. Both emphasize domestic concerns and international collaboration and provide a chronological overview of the context. Chapter 4 presents a detailed examination of economic, political, and military nuclear motivations, and their dynamic interaction. The thesis concludes with implications of nuclear proliferation in South Asia and effects on nonproliferation efforts.

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[17] Patricia Chatterjee, "Amid Blaring Headlines, India Mum on U.S. Nuclear Report," MSNBC News, New Delhi, 8 June 2000, URL: <http://www.msnbc.com/news/418094.asp>. Accessed 10 June 2000.

At this point, while the international community avoids or awaits the first-ever nuclear war, there remains much to be done. While much emphasis is focused on capabilities, India and Pakistan remain separated but by their intentions and will. The paradox of nuclear weapons is that their great power resides in political restraint from use instead of in its technological characteristics or military application. A country-specific approach to motivations for seeking the bomb highlights the commonalties and differences among nations and provides valuable insights for nonproliferation initiatives.

CHAPTER 2

ECONOMIC MOTIVATIONS FOR NUCLEAR POWER, 1945-1964

> [W]e have declared quite clearly that we are not interested in and we will not make these bombs, even if we have the capacity to do so.
>
> Prime Minister Nehru, Lok Sabha debate, 24 July 1957

> We are opposed to atomic bombs.... That is not an empty statement for us to make because we will be in a position--we have the competence and the equipment--to make them. We have deliberately said we will not make them.
>
> Prime Minister Nehru, New Delhi press conference, 17 September 1961

Unlike other nations that began their quest for nuclear power and nuclear weapons with a military motivation, India began with an economic one in the 1940s – the quest for nuclear power as a building block for national economic development. Weapons-related considerations were minimized and largely ignored until the 1950s and 1960s (as shown in Chapter 3). The assumption for India during 1947 to the mid 1960s was that "there is a declining military value in possessing nuclear weapons, but there is a continuing political value in the nonuse of nuclear weapons and in the nonuse of a visible nuclear option."[18] Thus, economic factors clearly outweighed military factors in India's early pursuit of a nuclear infrastructure.

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[18] Ashok Kapur, *India's Nuclear Option: Atomic Diplomacy and Decision Making* (New York: Praeger Publishers, 1976), 106.

The origins of India's bomb can be traced through two stages of its history. The first period began immediately after August 1945 when a U.S.-led collaborative international effort ushered in the atomic age. In 1946, the U.S.-proposed Baruch Plan highlighted the technical feasibility of commercial nuclear power. India's foundation for atomic energy began with Jawaharlal Nehru's economic vision of an India modernized by science and Dr. Homi Bhabha's application, as Atomic Energy Commission (AEC) Chair presumptive, of Nehru's vision to nuclear power. These two dominant personalities, who first met in 1937, subsequently developed a close professional relationship and personal friendship.[19] It set the stage for the S&T emphasis on initial economic motivations to develop India's industrial infrastructure. Nehru's vision and political leadership, along with Bhabha's establishment of the Tata Institute of Fundamental Research (TIFR), began well before India's long-sought colonial independence from Britain on 15 August 1947.[20] Although Nehru died in 1964, his non-alignment and nuclear power policies continued and have remained significant factors up to present day. A motivations study of his early nuclear considerations highlights the ever-present domestic issue of establishing a suitable foundation for India's economic development. It could therefore be suggested that India's early national security strategy was largely a domestic economic issue.

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[19] G. Venkataraman, *Bhabha and His Magnificent Obsessions* (Hyderabad: University Press India, 1994), 178.

[20] Bhabha's August 1943 funding request to the Sir Dorab Tata Trustees, considered in March 1944, was approved in April, contingent on government support. He established the TIFR in 1945 and served as director until his death. *Notable Twentieth-Century Scientists*, vol. 1, ed. Emily J. McMurray (New York: International Thomson Publishing Company, 1995), 172-173.

The second period (Chapter 3), a necessarily overlapping progression with the first, ran from the initial build-up to hostilities and actual conflict with China in 1962 until India's first peaceful explosion of a nuclear device in 1974. This period is often depicted as representative of the more traditional security-first framework.[21] That is, by the late 1950s, India began to recognize the necessity of developing a nuclear weapon to defend the nation against external aggression, namely China. This shift in motivations from purely economic to political (and subordinate military) represents a fundamental change of direction for India and brought it more into line with the initial motivations of the original nuclear powers -- the United States, Soviet Union, United Kingdom, France, and China.

Contrary to the prevailing theories postulating security as the primary motivation for acquiring nuclear power, Nehru's economic vision of modernity was the catalyst for India's initial acquisition decision. Only later would the dynamic interaction of motivations drive India towards a nuclear weapons program, despite the recent memory of Hiroshima and Nagasaki, and in spite of the resulting international nuclear technology hierarchy, which sought to control proliferation. In the interim, India faced a number of critical decision milestones for its nuclear power program (see Table 1). As Prime Minister Nehru would state in retrospect, while basic national interests remain constant, any "application to a particular circumstance, or resolution, is a matter of judgment."[22]

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[21] U.S. Congress, Office of Technology Assessment, *Proliferation*, 55.

[22] *Nehru's Speeches, September 1957 - April 1963*, vol. 4 (New Delhi: Publications Division, Government of India, 1964), 384.

1947	Bhabha Visits Canada, Uranium Oxide Supply Agreement
1948	Atomic Energy Act
1951	(France) Nuclear Cooperation Agreement
1952	Four-year plan to Develop Nuclear Capability
1953	Atoms for Peace
1954 (1957)	Create Atomic Energy Establishment, Trombay (Inaugurated)
1954-1958	Bhabha's Long-term Three-stage Plan
1954	(UK) Apsara Research Reactor Negotiations
1955 / 1956	(Canada) CIR Research Reactor Offer / Agreement
1956	(U.S.) Heavy Water Contract, thus CIRUS Research Reactor
1956	Apsara Research Reactor Critical (First in Asia)
1956	Conference on IAEA Statute Safeguards
1958	Plutonium Reprocessing Facility Plan
1960	CIRUS Research Reactor Critical
1962	(Germany) Nangal Heavy Water Processing Plant
1963	(U.S.) Tarapur Power Reactor Contract, 1st IAEA Safeguards
1964	Trombay Plutonium Reprocessing Facility Active

Table 1. Key Indian Nuclear Decision Milestones

Source: Author created.

SAFEGUARDING INDEPENDENCE, OVERCOMING POVERTY

Nehru promoted the "scientific approach to the problems of society."[23] According to India's current president, Nehru's earliest stated priorities were twofold: to safeguard newly won independence and to overcome poverty. Describing his Five Year Plans to modernize India as *science in action*, Nehru set up a strategic coalition between scientists and economic planners in India that survives to this day. Dr. Homi Bhabha, his

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[23] Shri K. R. Narayanan, President of India, speech presented at the Inauguration of the Birth Centenary Celebrations of Dr. K. S. Krishnan, Bangalore, India, 28 July 1998, text, Indian Parliament homepage, URL: <http://parliamentofindia.nic.in/>. Accessed 1 June 2000.

successor Vikram Sarabhai, and their colleagues implemented India's S&T development including atomic energy, space, computers, and missiles.

India's policy was in essence Nehru's policy. His growing influence over national policy predated independence. He had been chief of the foreign affairs department of the National Congress since 1928, and his party dominated Indian politics for 30 of the first 33 years of independence. Nehru also held the premier and foreign minister posts during the first 17 years. As the first Prime Minister, he crafted the basic framework of India's non-alignment, which served as a precedent for future prime ministers, and he worked on India's constitution, enacted in 1949.[24]

In practice, Nehru was responsible for and under considerable pressure to effectively address the burgeoning economic situation in India. He saw the much-touted development of the peaceful uses of nuclear power as the emerging scientific means to overcome abject poverty. His economic motivations for infrastructure development, using as yet unproven nuclear reactor technology,[25] continued to drive India's nuclear power program well after his death in 1964. Bhabha, who served as Nehru's principal S&T architect and implementer of their then joint economic vision as well as India's principal nuclear contact for international collaboration, died in a plane crash in 1966. Despite their deaths, India's dual-track policies of nuclear weapons acquisition and economic development continued with little fundamental change into the 1970s.

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[24] For successive prime ministers [including Nehru's daughter Indira Gandhi, and her son Rajiv Gandhi] endorsement of Nehru's policy, see Zafar Shah, 12. India's constitution has been amended 85 times. India became a republic in 1950 and held its first general elections in 1952.

[25] The first commercial nuclear power reactor was in 1954-1956 (dependent upon the source and criteria: plans, construction, or operation date). For example, the French settled on formal details in 1951.

Nehru's Vision of a Nuclear India, 1945-1964

The prime minister, the position of political power in India, has a dedicated S&T function in India's ministerial government, as well as the leading and at times the sole role in nuclear policymaking. According to George Perkovich.

> The Prime Minister has, by tradition, always held the position of cabinet minister responsible for [S&T], which includes the Departments of Energy and Space.... In the prime minister's capacity as Minister of the Department of Atomic Energy, he or she has worked closely with the department's senior scientist / technologist, [Dr. Bhabha] who serves as chairman of the Atomic Energy Commission. Successive chairman have exerted extraordinary influence over India's nuclear activities and policies. Indeed, there are no means within India's institutional structure to provide independent scientifically expert checks and balances on the nuclear and defense establishments.... Within the government a Cabinet Committee on Political Affairs has formed the highest decision making group.... In addition to the prime minister, the Cabinet Committee traditionally consists of the ministers for external affairs, defense, home affairs, and finance.... This body thus represents the most important bureaucracies involved in Indian nuclear policy. However, prime ministers have formulated policies without consulting the Cabinet Committee.[26]

Indian policymakers early recognized the military dimension of a nuclear option, as evidenced during the debate over Nehru's 1948 introduction of India's Atomic Energy Act, modeled after the British Act.[27] While peace and economic development were Nehru's genuine hope, he understood the inherent duality of nuclear technology and the necessity for secrecy. Congressional debate touched on the inherent ambiguity of such a program and its potential for military use. In that debate, Nehru acknowledged his personal difficulty in distinguishing between nuclear physics intended for commercial power or for defense against any then ill-defined threat. The debate also touched on India's past failures to adopt new technology as a source of economic power, moral

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[26] Perkovich, 9.

[27] Perkovich, 18.

opposition to nuclear weapons, and funding. Despite opposition objections, the act was approved before the 1949 founding of the Communist PRC and before a perceived Chinese or any other credible external military threat. Thus. India's ultimate quest for a nuclear weapons capability began as part of Nehru's vision for a peaceful, economically developed, nuclear-powered India. Weapons-specific considerations were radically subordinated to this overall goal. with only the potential for weapons in some distant unknowable future.

Politically. Nehru was likely constrained by India's tradition of a Mahatma Gandhi moral aversion to nuclear weapons. Pragmatically, while he publicly disavowed support of a nuclear option and overt development of nuclear weapons, he tacitly allowed Bhabha to establish the time-intensive S&T foundation for just such a consideration. Still, "Intentions are what determine usage. Here. at the level of intention, Nehru did not rule out military use."[28]

The Role of Dr. Homi Bhabha, 1943-1966

The Atomic Energy Act formally established and funded nuclear research and S&T development under an Atomic Energy Commission (AEC) in August 1948.[29] It also served as the legal impetus for its commercial nuclear power program under Chairman Bhabha's leadership. According to Perkovich, "His confident demand for autonomy and resources set the tone for the development of the Indian nuclear program under his

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[28] *Constituent Assembly of India (Legislative Debates)* 5. 6 April 1948. 3323, in Perkovich, 20.

[29] Bhabha was the early driving force in India's atomic power program. Canada agreed to supply India with uranium oxide following Bhabha's visit in 1947. Itty Abraham, *The Making of the Indian Atomic Bomb: Science. Secrecy and the Postcolonial State* (London: Zed Books, 1998). 84.

direction."[30] The TIFR and the AEC also reflected Nehru and Bhabha's early perceptions of nuclear research as a worldwide symbol of S&T prestige. Because of its perceived importance, atomic energy, along with railways and the manufacture of arms and ammunition industries, was monopolized under government control in 1948.[31]

Bhabha's vision of India's self-sufficient S&T establishment remains a much-heralded matter of great national pride. In his formal proposal to establish the TIFR,[32] he described his institute as

> an embryo from which I hope to build up in the course of time, a School of Physics comparable to the best in the world. When nuclear energy has been successfully applied for power production in ... a couple of decades from now, India will not have to look abroad for ... experts but will find them ready at hand.[33]

Since 1948, India and the TIFR have become the world's second-largest contingent of scientists and engineers; however, early on many of them were foreign trained. Between 1955 and 1974, more than 1,100 Indian nuclear scientists and engineers trained in the

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[30] Perkovich, 16.

[31] Francine R. Frankel, *India's Political Economy, 1947–1977* (Princeton, New Jersey: Princeton University Press, 1978), 77.

[32] Homi Jehangir Bhabha, Ph.D. Cambridge, UK (1935), did research at the Cavendish Laboratory until 1939. Visiting India when WWII broke out, he was unable to return to England to work. *Random House Webster's Dictionary of Scientists*, ed. Sara Jenkins-Jones (New York: Random House, 1997), 51.

[33] N. Seshagiri, *The Bomb! Fallout of India's Nuclear Explosion* (New Delhi: Vikas Publishing House, 1975), 115-116.

United States[34] with Canada training another 263 prior to 1971.[35] As a result, extensive U.S. and foreign expertise and material assistance, often with very favorable funding arrangements, further sanctioned India's S&T commitment to its nuclear research and power program.[36]

Bhabha, was the President of the First United Nations International Conference on the Peaceful Uses of Atomic Energy held in Geneva in August 1955. The conference led to calls for the declassification of nuclear research. Such responses also led to open publications that advanced India's nuclear program and its early entry into plutonium reprocessing.[37] The second conference, held in 1958, was about twice as large. At that meeting, Lewis Strauss, President Eisenhower's special assistant on atomic energy matters, announced that the United States had declassified data on research aimed at producing power from controlled thermonuclear reactions.[38] Soon after, the United States provided 200 linear feet of declassified nuclear power information to interested foreign countries.[39]

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[34] Roberta Wohlstetter, *The Buddha Smiles. Absent-Minded Peaceful Aid and the Indian Bomb* (Los Angeles: Pan Heuristics, 1977), 28-30.

[35] Robert S. Anderson, *Building Scientific Institutions in India: Saha and Bhabha*, Occasional Paper no. 11 (Montreal, Canada: Center for Developing Area Studies, McGill University, 1975). 101.

[36] A U.S. $80 million credit at 0.75 percent interest over 40 years funded Tarapur. Perkovich. 60.

[37] France, not a declared nuclear weapon state until 1960, published its formerly secret chemical reprocessing method of plutonium extraction, similar to the U.S. plutonium uranium recovery by extraction (PUREX) method. For comments on U.S. views of its allies as "atomic rivals," see Bertrand Goldschmidt, *The Atomic Complex. A World-wide Political History of Nuclear Energy* (La Grange Park, Illinois: The American Nuclear Society, 1982), 259.

[38] Eisenhower Library and Museum homepage. Atoms for Peace, URL: <http://www.eisenhower.utexas.edu/atom7.htm>. Accessed 5 June 2000.

[39] Department of State. "Regulation of Armaments and Atomic Energy," *Foreign Relations of the US 1955-1957*, vol. 20. Publication 9759 (Washington, DC: Dept. of State, 1990), 27.

Bhabha's nomination as conference president was greeted in India as a symbolic achievement, marking the increasing prestige of India's AEC. However, according to Itty Abraham, Bhabha's nomination, with strong British backing, was the least politically objectionable choice.[40]

Overall, Bhabha directed research and the instruction of advanced physics, and was responsible for the establishment and much-needed direction of India's nuclear power program. He also commanded wide respect in the international scientific community for his scientific contributions and formidable skills as an administrator. Credited with the awakening of his government's awareness of the potential importance of atomic energy, Bhabha emphasized at the Third UN Conference in 1964, "No power is as expensive as no power"[41] for all developing nations.

Establishing a Nuclear Foundation for Electric Power and a Nuclear Weapons Option

In 1951, India signed a nuclear cooperation agreement with France, "the first bilateral international nuclear project after the Second World War."[42] In 1952, Nehru announced a four-year plan to begin developing India's nuclear capability, which included surveying atomic materials and processing monazite to obtain thorium. He remarked, "The equation of defense is your defense forces plus your industrial and technological background, plus, thirdly, the economy of the country, and fourthly, the

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[40] Abraham, 88-89.

[41] *The Biographical Dictionary of Scientists*, 2d ed., ed. Roy Porter (New York: Oxford University Press, 1994), 70.

[42] Abraham, 83-84.

spirit of the people.... [Philosophically] the right approach to defense is to avoid having unfriendly relations with other countries."[43] Nehru's national security outlook put India somewhat ahead of China industrially and in atomic energy. Thus, according to Brookings analyst Stephen Cohen, its "original faith in nuclear technology was a way in which India could leapfrog intermediate technologies and dramatically improve the lot of the average citizen."[44]

India's Department of Atomic Energy (DAE) was created on 3 August 1954, with Bhabha under the direct charge of the Prime Minister. That same year, the Atomic Energy Establishment, Trombay (AEET) was created, with responsibilities for nuclear power programs directly involved in *applications* of nuclear reactor design, electronics, and material science (plutonium reprocessing and uranium enrichment). These tasks were moved from TIFR to the AEET, leaving the TIFR devoted to fundamental research.[45]

Intended to maximize India's use of its limited uranium reserves, the DAE initiated a long-term, three-stage program that Bhabha formally presented at the Atomic Energy Conference in New Delhi, November 1954. The outlined stages were:

- Build natural uranium-fueled reactors (with Canadian assistance) for power production and, as a byproduct, plutonium.

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[43] "The Plan is the Country's Defense," in *Jawaharlal Nehru's Speeches*, vol. 3, September 1953 – August 1957 (Delhi: Ministry of Information and Broadcasting, 1958), 38-43.

[44] Stephen P. Cohen, "Nuclear Weapons and Conflict in South Asia," URL: <http://www.brook.edu/views/articles/cohenS/1998TSP.htm>. Accessed 10 June 2000.

[45] Bhabha died in a plane crash on 24 January 1966. Prime Minister Indira Gandhi renamed the AEET the Bhabha Atomic Research Center (BARC) on 12 January 1967, in memory of its founder. Bhabha Atomic Research Center homepage. URL: <http://www.barc.ernet.in/barc/index.html>. Accessed 16 December 1999.

- Plan and build reactors run on recycled, first-stage reactor plutonium and abundant Indian thorium.

- Construct breeder reactors run on Uranium-233, a byproduct of second-stage plutonium-thorium fuel fission.[46]

It should be noted that Bhabha outlined this ambitious proposal before there were any operating commercial nuclear power plants *anywhere* in the world. It was highly significant because it served as the link between peaceful and potential military uses of atomic energy by no later than early 1964.

Bhabha's ambitious plan, focusing on plutonium and emphasizing India's need for the capability to separate plutonium from spent fuel, was the basis for India's later nuclear weapons option. Access to Canadian natural uranium technology under the $24 million Colombo Plan grants,[47] allowed India to move toward greater self-sufficiency. India opted for the Canadian proposal because turning to the U.S. enriched uranium technology would have left India dependent on U.S. or foreign fuel supplies. In essence, India's atomic energy foundation, with a possible weapons option, was "based on [forecasted] Indian S&T expertise, Canadian technology and goodwill, and Bhabha's international reputation and bargaining skill."[48] According to the editors of *Tracking Nuclear Proliferation*, status exceeded security as key motivators.

> [In effect,] for the senior elected officials and a larger domestic constituency, the motives for India's nuclear, space, and missile development has arisen more from status than security needs. Developing India's [S&T] capacity-civilian and

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[46] Dhirendra Sharma, *India's Nuclear Estate* (New Delhi: Lancers Publishers, 1983), 19-22.

[47] For Canadian aid under the Colombo Plan for Cooperative Economic Development in South and Southeast Asia, including part of the estimated $14 million reactor installation (final cost $24 million), see Department of State, *Foreign Relations of the U.S. 1955-1957*, vol. 8, South Asia, Publication 9538 (Washington, DC: Dept. of State, 1987), 467.

[48] Kapur, 192-193.

military-is seen as the means of demonstrating India's world-class leadership potential and of satisfying India's pressing need to have advanced technology to modernize the nation's still underdeveloped infrastructure and economy.[49]

JUMP-STARTING INDIA'S NUCLEAR PROGRAM

International collaboration, often heralded as competition, provided India a significant boost for its nuclear power program. The United States as a benevolent superpower had already begun to seek international controls over nuclear power from its position of strength developed during World War II. India, newly independent from such perceived colonial restrictions and within recent memory of the use of atomic weapons, strove to maintain its freedom of action and to develop its industrial infrastructure for economic development. India's nuclear motivations included the drive to self-sufficiency and the subsequent turn to perceived self-reliance.

The Baruch Plan

In June 1946, the Truman administration put forth its plan of international dissemination and control of atomic energy. Presented to the United Nations by the U.S. representative Bernard Baruch, it declared,

> We must embrace international cooperation or international disintegration. Science has taught us how to put the atom to work. But to make it work for good

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[49] *Tracking Nuclear Proliferation: A Guide in Maps and Charts 1998*, eds. Rodney W. Jones and Mark G. McDonough (Washington, DC: Brookings Institution Press, 1998), 111.

instead of for evil lies in the domain dealing with the principles of human duty. We are now facing a problem more of ethics than of physics.[50]

Among its provisions, the plan included four specific proposals of importance to India and other emerging nuclear states:

- Extending between all nations the exchange of basic scientific information for peaceful ends
- Control of atomic energy to the extent necessary to ensure its use only for peaceful purposes
- Elimination from national armaments of atomic weapons and of all other major weapons adaptable to mass destruction
- Effective safeguards by way of inspection and other means to protect complying States against the hazards of violations and evasions.[51]

In essence, the plan proposed international control over the entire nuclear fuel cycle. The Soviet Union opposed it, refused to accept inspections within its borders, and, in retrospect, had likely been involved in its own nuclear weapons program since 1939. India agreed in principle to peaceful uses of nuclear power but opposed any measures to restrict a country's right to develop its own resources. "India was and would remain fiercely jealous of its sovereignty, resistant to any inequalities and inequities, wary of any semblance of colonialism, and righteous in it demands for disarmament."[52]

The Baruch Plan asserted that a nuclear weapons option was more of an ethical choice than a physics problem. Early enthusiasm for a scientific approach to the energy

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[50] U.S. Congress, Senate Committee on Governmental Affairs, *Nuclear Proliferation Factbook*, 103rd Cong., 2nd sess., December 1994, S. Doc. 103-111, 1995, 8.

[51] U.S. Congress, Senate, *Nuclear Proliferation Factbook*, 4.

[52] Perkovich, 21.

crisis through the power of the atom did not fully consider the proliferation implications. The early spread of nuclear technology was viewed as an academic application of nuclear physics for peaceful purposes; however, the commensurate knowledge and policy to understand and manage its spread did not keep pace.

Operation Candor / Atoms for Peace[53]

President Eisenhower's domestic strategy to educate the U.S. public about nuclear war, Operation Candor, grew into a program to provide international opportunities for nuclear power, Atoms for Peace. Eisenhower, committed to end the nuclear arms race, sought the support of the American people for realistic arms control measures, especially in light of the belief that the Soviets had tested a hydrogen bomb in August 1953. However, even with the assistance from Lewis Strauss and C. D. Jackson, his special assistant for Cold War strategy, Operation Candor could not come up with a positive approach for addressing the issue of thermonuclear war. On 10 September 1953, Eisenhower himself devised an idea for a nuclear disarmament mechanism that intended to reduce *military* reserves by shifting fissionable materials to peaceful uses brokered through a United Nations "bank." This perceived straightforward confidence-building mechanism, aimed primarily at the United States and the Soviet Union, was presented to the United Nations as his "Atoms for Peace" proposal. He reasoned that a better use

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[53] The potential scope and importance of a motivation study are evident in the extent of the international collaboration effort, which, along with the momentum of technology, is largely responsible for the proliferation of nuclear technology. The merits of examining the U.S. Atoms for Peace program and researching its effects on the proliferation of nuclear technology since the 1950s has been suggested as a focus of further research, although comprehensive study of such a collaborative process is outside the scope of this thesis. (b)(3):10 USC interview by the author, 27 July 2000.

could be found for such power that would also protect U.S. technology and expand U.S. reactor markets overseas.[54]

The United States contention of an overarching UN-brokered bank of fissile material did not fit India's contention of developing its own S&T program. Nehru expressed doubt that a UN organization would represent India's interests, as it would likely be dominated by the major powers. In the case of India's largest neighbor, the PRC was not a member of and was under no obligation to the United Nations. Further, as early as 1954, Nehru understood that nuclear weapons "cannot be controlled by a mere desire or demand for banning them."[55] India initially rejected it on two counts. As an enforcement mechanism, the United Nations sought to exert control over those countries that were most in need and it did not address the potential PRC threat.

India's Multinational Nuclear Infrastructure

India and the United States had initiated diplomatic relations in 1941.[56] In 1946, the emerging Indian government requested U.S. economic assistance, and in 1947 both India and Pakistan began early discussions with the United States about conventional

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[54] Pres. Dwight D. Eisenhower, Atoms for Peace speech presented at the UN, 8 December 1953, final draft copy, URL: <http://www.eisenhower.utexas.edu/atom12.htm>. Accessed 21 May 2000.

[55] Jawaharlal Nehru, "Control of Nuclear Energy" speech presented to the Lok Sabha, 10 May 1954, in *Jawaharlal Nehru's Speeches*, vol. 3, 254.

[56] Dennis Kux, *India and the United States: Estranged Democracies 1941-1991* (Washington, DC: National Defense University Press, 1993), 447.

weapons transfers.[57] The United States faced crafting a policy addressing Indian and Pakistani concerns.

Both India and Pakistan took advantage of Atoms for Peace. India was one of the first collaborators in the program. Canadian assistance provided India with its first research reactor, while the United States helped to build Pakistan's first nuclear reactor. Eisenhower recognized the early proliferation risks but judged them acceptable, believing, as in the spirit of the Marshall Plan, that the potential peaceful benefits justified the effort. Still, "Atoms for Peace threatened to lead to greater nuclear proliferation and could contribute to the spread of nuclear weapons throughout the world."[58]

Sidestepping IAEA Safeguards

With the Atoms for Peace plan as a foundation, *safeguards* were institutionalized in the IAEA, established by treaty. Early efforts to address nuclear proliferation were formalized with the approval of the IAEA statute on 23 October 1956 during the Conference on the Statute of the International Atomic Energy Agency held at UN

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[57] Department of State, *Foreign Relations of the U.S. 1955-1957*, vol. 8, 357-358. For India's 1951 military sales agreement and refusal of 1954 military aid, see vol 8, 62; For India's 1952 Sherman tank delivery, see Kux, 86.

[58] Eisenhower Library and Museum homepage, Atoms for Peace, URL: <http://www.eisenhower.utexas.edu/atom6.htm>. Accessed 1 June 2000. For his warning of the danger of the prospect of domination of the nation's scholars by federal money or that *public policy could itself become the captive of a scientific-technological elite*, see "Farewell Radio and Television Address to the American People," 17 January 1961, URL: <http://www.eisenhower.utexas.edu/farewell.htm> Accessed 1 June 2000.

Headquarters. The statute became effective on 29 July 1957.[59] By 1962, there were 37 peaceful bilateral agreements covering the provisions of research, power reactors, technical advice and training.[60]

Early safeguard considerations prompted a U.S.-led initiative that allowed states to *request* nuclear training and assistance providing such an exchange permitted international safeguards--accounting and control over resulting fissionable material, to include plutonium. During a September IAEA conference, Bhabha successfully argued that India should exercise its right to produce and hold plutonium required for its own peaceful power programs. He objected to U.S.-led efforts to require strict safeguards based on the acceptance of IAEA technical assistance. As he noted, only the technologically less developed countries required assistance and would therefore be subject to safeguards, while the established nuclear powers would not be obligated to apply such safeguards. His 22 October argument over particular uses of fissionable material "ensured that the [IAEA] would not be given powers which would enable it to interfere in the economic development and the economic life of the States concerned."[61]

Due to India's early and continuing insistence on self-sufficiency, or at least on minimal international control, its fuel-cycle facilities (reprocessing, enrichment, fuel

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[59] For the IAEA serving "as the world's central intergovernmental forum for S&T co-operation in the nuclear field," and Article II objectives to "seek to accelerate and enlarge the contribution of atomic energy," see Statute of the International Atomic Energy Agency. IAEA homepage. URL: <http://www.iaea.org/worldatom/glance/profile/statute.html>. Accessed 10 June 2000.

[60] Eisenhower Library and Museum homepage, URL: <http://www.eisenhower.utexas.edu/atom7.htm>. Accessed 5 June 2000. U.S. domestic energy needs and international implications date from 1958 when it consumed more energy that it produced. For the inherent economic inefficiency of nuclear power in generating electricity, see "Plutonium Production," Federation of American Scientists homepage. URL: <www.fas.org/nuke/intro/nuke/plutonium.htm>. Accessed 21 June 2000.

[61] J. P. Jain, *Nuclear India*, vol. 2 (New Delhi: Radiant, 1974), 72.

fabrication, and heavy water production facilities) with few exceptions, were established and remain outside IAEA safeguards. Bhabha, therefore "played the decisive role in India's successful effort to weaken the scope of safeguards."[62]

Initial Nuclear Facilities

India's research reactor, Apsara, was the first nuclear reactor in Asia outside the Soviet Union. It was a maximum one-megawatt thermal (MWt) "swimming pool" type suggested to Bhabha in September 1954 by Sir John Cockcroft, a former Cambridge associate and then head of the UK Atomic Energy Authority's main facility.[63] Based on British design plans, construction began in 1955 and the reactor went critical on 4 August 1956. The British-provided uranium fuel is safeguarded under a supply contract.[64]

In 1955, Canada offered to build a larger 40 MWt CIRUS (Canadian-Indian Reactor, United States) research reactor under the Colombo Plan. On 10 July 1960, the heavy water, natural Uranium research reactor went critical, using Canadian, then Indian, fuel. Not fully operational until 1963, it operated without IAEA safeguards. The original agreement did include a stipulation that the reactor would be for peaceful purposes only. However, as with many such agreements, it did not provide any effective enforcement mechanism, permitting India to interpret its 1974 nuclear explosion as a "peaceful" one

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[62] Perkovich, 28-29.

[63] For Bhabha and Cockcroft's correspondence, see Abraham, 83-85.

[64] The BARC homepage lists the reactor went critical in 1957.

and therefore in compliance. However, because India used CIRUS-produced plutonium for its nuclear test. Canada ceased all nuclear cooperation with India.[65]

India's first nuclear supply relationship with the United States was for the 1956 contract and sale for CIRUS heavy water, a $250,000 gift, under a similar peaceful purposes stipulation. During Eisenhower's December 1959 trip to India, Nehru raised the topic of atomic power. He was anxious to get at least one nuclear plant of 50,000 to 100,000kw capacity to start India's commercial power program.[66] The first U.S. contract, for the Tarapur reactors, was not completed until 1963.

In the interim, India's indigenous but troublesome heavy water processing facilities began with a pilot-scale facility at Trombay. The first full-scale heavy water processing facility, Nangal, supplied by the West German firm Linde in 1962, remains in operation for domestic and export production today.[67] According to Seshagiri and Wohlstetter, Bhabha decided in July 1958 to build a reprocessing facility at Trombay to extract plutonium from spent fuel.[68] Regarded as the key facility to build nuclear devices, construction ("Project Phoenix") began on its Trombay plutonium-reprocessing

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[65] Initial 1955 references to a CIR (Canada-India reactor) agreement preceded the 1956 U.S. contribution of heavy water, thus the CIRUS reference. "Selected Indian Nuclear Facilities," July 1999, Center for Nonproliferation Studies homepage, URL: <http://cns.miis.edu/research/india/nuclear.htm>. Accessed 12 June 2000.

[66] Nehru commented "if something spectacular could be done to show the attachment of the West and the interest of the West in India." Eisenhower, the first president to visit independent India, did the world tour just to get to India. Memorandum of Conversation, subject: Relations Between India and Pakistan; Trend of Development in USSR and Communist China, 10 December 1959, Department of State, *Foreign Relations of the U S 1958-1960*, vol. 15, South and Southeast Asia, Publication 9996 (Washington, DC: Dept. of State, 1992), 520-526.

[67] Nuclear Engineering International, *World Nuclear Industry Handbook 1996* (London: Reed Business Publishing, 1995), 117.

[68] Wohlstetter, 55.

facility in March or April 1961; it was commissioned in 1964. The first test with an inactive fuel element was on 31 March 1964, with active fuel introduced on 1 June 1964.[69] Thus, by late 1964, or early 1965, the plant provided India with its first weapons grade plutonium.

The Tarapur Contract

U.S. nuclear power conflicts with India are well characterized by the Tarapur contract. India's first two operating reactors, designated Tarapur 1 and Tarapur 2, were boiling-water type, light water moderated, low-enriched uranium fueled reactors.[70] They were part of an Atoms for Peace 1963 contract reactor construction. The United States provided very favorable financing and uranium fuel after India agreed to allow IAEA safeguards--the first such safeguards anywhere. The 30-year nuclear cooperation contract stipulated that the reactors would run exclusively on U.S. fuel, but the agreement was not without controversy. Having some indication that India was misusing U.S. nuclear material under the peaceful use stipulation, the United States pressed the issue, but without resolution, on the Indian AEC in Bombay on 16 November 1970.[71] The United States did suspend Tarapur fuel shipments to India in September 1974 in response to India's nuclear test in May.

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[69] Trombay was shut down from 1973-1982. Seshagiri, 119.

[70] Operational in 1969.

[71] Sen. John H. Glenn (D-OH), "Disapproval of Enriched Uranium to India," Senate Floor Statement (23 September 1980), in U.S. Congress, Senate, *Nuclear Proliferation Factbook*, 90-91.

In late 1963 or early 1964, Canada agreed to construct the Rajasthan Atomic Power Station unit 1 (RAPS-1) heavy water moderated Canadian deuterium-uranium (CANDU) reactor. Completed in 1973, it operates under safeguards, but remains India's least productive reactor due to technical problems. The RAPS-2 project, also begun by Canada, was interrupted when Canada ceased nuclear assistance in 1976. India ultimately completed construction on RAPS-2. Due to the expertise gained from CANDU troubleshooting and construction experience, India's proclaimed self-sufficiency began with the *indigenous* RAPS-1 in 1967 and RAPS-2 in 1971(despite Canadian assistance).

CONCLUSION

Nehru's vision of a nuclear India concentrating on economic development could only be achieved with U.S.-led international cooperation. Fortuitously for Nehru and Bhabha, the Atoms for Peace initiative appeared at precisely the right moment for India to take full advantage of U.S. generosity. Canadian and U.S. assistance jump-started India's nascent nuclear program although India early and consistently sought to avoid IAEA safeguards. Nehru's and Bhabha's recognition that a nuclear weapons option was inherent in the infrastructure being built for peaceful purposes led them to seek and achieve a plutonium reprocessing capability in the late 1950s and early 1960s. India's quest for the bomb continued after the deaths of these two principal players in 1964 and 1966, culminating in the first nuclear detonation in 1974. Unlike the nuclear ambitions of other nations, India's quest began with almost exclusive emphasis on peaceful economic

development of nuclear power. Military applications were a secondary consideration arrived at by a different set of motivations and catalysts.

CHAPTER 3

THE BOMB: INDIA'S BID FOR SELF-RELIANCE, 1962-1974

> In the pre-1964 and 1964 Indian nuclear perspective, there were in fact at least two decisions: first, to keep the nuclear option open and to establish the technological base for a military program; second, to refrain from building a bomb at present and, by implication, to refrain from making visible a nuclear infrastructure of a military nature."
>
> Ashok Kapur, 1976

India became the world's *de facto* sixth nuclear power with its 18 May 1974 Pokhran I single underground explosion of a nuclear device. Claiming credit as the first nation to conduct its initial test underground, it portrayed a narrowing of the large technological gap between itself and the UN-brokered nuclear power security framework.[72] Despite India's disclaimer that the 1974 test was only a *peaceful* nuclear explosion, it has been hailed by critics as either the "first deliberate step taken along the inevitable path of nuclear weapons.... [or] no more than a gesture of independence and a bid for inexpensive prestige."[73] However, given the national security concerns raised by

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[72] India, a signatory to the Limited Test Ban Treaty, was obligated to test underground. The U.S. developed the bomb for a WWII military application, in part as a response to a reported German program. The USSR contended its bomb offset the imbalance caused by the U.S.' nuclear monopolistic situation. The UK sought to safeguard Western European interests and to counterbalance the USSR. The PRC sought independence from USSR assistance (1960) and to offset U.S. support for Taiwan (1971). Charles de Gaulle's insistence on French strategic independence (to heighten its prestige or to export sovereignty and independence) offered France an opportunity to lead a continental Europe less dependent on the U.S.

[73] Surjit Mansingh, *India's Search for Power: Indira Gandhi's Foreign Policy 1966-1982* (New Delhi: Sage Publications, 1984), 59.

India's ongoing conflict with China over Tibet, China's own entry into the nuclear club in 1964, and renewed war with Pakistan, India became increasingly aware of the value of a nuclear weapons capability in its relations with its Asian neighbors and the rest of the world. Table 2 indicates the key milestones in its quest for the bomb.

1959-1962	Tibet Rebellion / PRC - India Conflict
1964	Prime Minister Nehru Dies
1964	PRC Nuclear Weapon Test
1964	Defense Planning Introduced for the First Time
1965	Pakistan Initiated Rann of Kutch Crisis, War
1965	India Seeks UN Nuclear Guarantee
1966	Prime Minister Shastri / AEC Chairman Bhabha Die
1968	NPT Negotiations
1971	PRC Becomes UN Security Council Permanent Member
1971	Bangladesh Crisis
1974	Peaceful Nuclear Explosion

Table 2. Key Indian Nuclear Decision Milestones

Source: Author created.

CHANGE IN ADMINISTRATION -- NUCLEAR WEAPONS CONTINUITY

Nehru had little confidence in superpower-directed international security systems and Bhabha placed little trust in disarmament as a strategy, although both recognized the political value of nuclear weapons and, as such, did not irreversibly commit India to reject nuclear weapons. According to Perkovich, India's nuclear option was not a matter of making a one-time all-important decision but of the Prime Minister tacitly allowing a

largely autonomous program to serve as a foundation if the need arose.[74] And, at each of these decision points, primary and secondary motivations played a major role in dictating whether and how to proceed.

Nehru's tacit approval of an Indian S&T foundation and nuclear weapons option policy likely remained unchanged until the 1974 test, even after he died in May 1964. The new Prime Minister Lal Bahadur Shastri continued Nehru's policy of declared opposition to nuclear weapons. However, in a major departure from past official statements, on 27 November he openly supported development of a peaceful nuclear explosion (PNE) and thereby gave official sanction to India's nuclear weapons option.[75] Shastri's considerations included acquisition of either an independent nuclear deterrent, primarily against China, or a credible security guarantee from the other nuclear powers. This was a key point that he sought from Britain during Prime Minister Wilson's visit in December 1964.[76]

January 1966 marked another transition point. Shastri died unexpectedly on 10 January and Bhabha on 24 January. Bhabha's passing ended his nearly autonomous reign and virtual monopoly over atomic energy within the AEC. The new Prime Minister Indira Gandhi probably was unaware of the full extent of the nuclear weapons program. Bhabha's successor, Vikram Sarabhai, head of the Indian National Committee for Space

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[74] Perkovich, 20-21.

[75] Spector, 64. Shastri was Prime Minister from June 1964-January 1966.

[76] Dean Rusk, Telegram to Governor Harriman, Washington, DC, 27 February 1965; Subject-Numeric File, 1964-1966: Central Files of the Department of State, Record Group 59, National Archives Building, Washington, DC.

Research, was not Gandhi's first choice but, according to Ashok Kapur, his appointment was a domestic political consideration.[77]

Sarabhai sought to disassociate India from the bomb. He quickly espoused maintaining "the rate of progress of the economic development of the nation.... [Moreover,] think[ing] of both the external and internal threat ... I fully agree with the Prime Minister ... when she says that an atomic bomb explosion is not going to help our security."[78] He attempted to shut down the PNE project in June 1966 but was not entirely successful because of momentum within the AEC bureaucracy and possibly because the prime minister was still wavering on confronting the nuclear weapons option.[79]

India's quest for a nuclear weapons capability did not die in the critical 1964-66 period despite the passing of its original visionaries, Prime Minister Nehru and Chairman Bhabha. The external threat to national security was reaching a critical stage, and India believed its options were limited. A review of these threats will place its decision and motivations to proceed to the bomb in perspective.

A PREOCCUPATION WITH CHINA, 1958-1964

The rise to power of the Chinese Communist Party in 1949 brought new perspectives to the subcontinent. India officially recognized the PRC on 29 April 1954. By 1958, however, a border dispute began to sour relations, although China's

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[77] Kapur, 195.

[78] J. P. Jain, 179-180.

[79] For a detailed implications account of the change in administration, see Perkovich, 112-124.

announcement of its intentions to develop nuclear weapons did not evoke widespread public discussion in India.[80]

While India insisted in 1954 on maintaining the traditional British-defined border, China sought to acquire over 50,000 square miles of territory. In January 1959, China officially claimed the three disputed regions during Tibet's rebellion, and the Dalai Lama fled to India. In November 1961, India adopted an ambitious forward military presence in the disputed region. From July through September 1962, Chinese and Indian forces maneuvered for position. On 20 October, China launched large-scale attacks and routed Indian forces. During 26-28 October, Nehru requested urgent U.S. military aid and air support. President Kennedy, immersed in the Cuban missile crisis, did dispatch the aircraft carrier USS *Enterprise* but the war ended on 21-22 November when China declared a unilateral cease-fire and withdrawal. In February 1963, China and Pakistan reached an agreement on their common border, ostensibly offsetting both Indian and waning U.S. influence.[81]

The conflict brought about a significant reevaluation of Indian foreign and military policy. One likely result of the crisis, India introduced defense planning in 1964 for the first time.[82] Also, in December 1963, the Jana Sangh Party made the first formal demand in Parliament to reverse India's declared policy and produce nuclear weapons, in part because the conflict exposed weaknesses in India's standing military capabilities.

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[80] *Tracking Nuclear Proliferation*, 119.

[81] Perkovich, 42-46.

[82] B. M. Jain, *India's Defence and Security: Intra-regional Dimension* (Jaipur, India: Ina Shree Publishers, 1998), 2.

However, critics and analysts seeking to espouse the nuclear option contended that nonalignment could not guarantee India's national security.[83] Neither did military agreements with the United States. The 1951 Mutual Security Accord with the United States evolved into a new military agreement in November 1962 spotlighting their common enemy, China, giving India at least a breathing spell in its relations with China. Also, in July 1963, India concluded an Air Defense Agreement, with the United States agreeing to consult with India in event of a new Chinese attack. However, China's entry into the nuclear club with its first detonation in October 1964 made these agreements virtually moot since they did not deal with a *nuclear* threat to India. The U.S. nuclear umbrella simply could not protect India from China under virtually any reasonable scenarios.

THE RANN OF KUTCH CRISIS LEADS TO WAR

As part of the growing concern over the nuclear weapons potential of India's nuclear *power* program, Pakistan gambled on war. In April 1965, Pakistani military patrols led to maneuvering for position in the Rann of Kutch.[84] Although India later withdrew, in May, a Pakistani-initiated confrontation in Kargil, Kashmir escalated into India's occupation of territory held by Pakistan since 1948. A ceasefire was agreed to on 27 June, with India again withdrawing. On 1 September, Pakistan launched a major

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[83] B. M. Jain, 30.

[84] It is a marshy area south of Karachi near the Arabian Sea. Pakistan initiated a dispute in 1954 by declaring the Rann of Kutch a sea (marking the border through the middle as governed by international law) vice India's declaration that it was a marsh (thus entirely within India's jurisdiction).

attack into southern Kashmir. but both countries' military activities subsequently ground to a standstill, and India accepted a UN cease-fire call on 20 September. Pakistan followed suit on 22 September. The day before, the Indian Prime Minister was beseeched by nearly one hundred members of Parliament to develop nuclear weapons.[85] A Soviet-mediated agreement on 10 January 1966 settled the peace but did not attempt to resolve the Kashmir issue.[86]

INDIA RESISTS THE NPT

Soviet and continued U.S. diplomatic pressure for India to sign the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) met with staunch resistance. In April or May 1967, a decision was made not to sign, although the rejection was not an indication that India *necessarily* intended to build nuclear weapons *immediately*. According to Foreign Secretary C. S. Jha, India's decision was made only after unsuccessfully seeking credible guarantees against nuclear attack and nuclear blackmail. Indeed, India had requested a nuclear guarantee from the United Nations on 4 May 1965 but subsequent deliberations failed to reach a consensus. Jha contended,

> For the big powers ... nonproliferation has come to mean selective proliferation.... [For India] to make nuclear weapons would needlessly alarm Pakistan, with whom we have no quarrel and risk touching off a nuclear arms race with it and perhaps also with China. For the types of conflicts India is likely to

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[85] Hari Ram Gupta, *India-Pakistan War, 1965*, vol. 1 (Delhi: Hariyana Prakashan, 1967), 105.

[86] Perkovich, 106-112.

get into, it needs conventional arms, and the diversion of scant resources into nuclear weaponry can only [weaken] the conventional defenses of the country.[87]

On 6 October 1967, India informed the United Nations it would not sign the NPT. According to the statement by Defense Minister Swaran Singh,

> While ... India continues to be in favor of the non-proliferation of nuclear weapons, it is equally strongly in favor of the proliferation of nuclear technology for peaceful purposes, as an essential means by which the developing countries can benefit from the best advances of science and technology in this field.[88]

THE DISMEMBERMENT OF PAKISTAN

In November and December 1971, perceived unequal political and economic situations between West and East Pakistan led to widespread internal unrest among separatists in East Pakistan. West Pakistani military forces entered the breakaway province, and ten million refugees overflowed into India.[89] In November 1971, Indira Gandhi authorized Indian forces to cross the border.[90] President Nixon dispatched the (presumably nuclear armed) USS *Enterprise* carrier group, and on 12 December it was ordered into the Bay of Bengal to buttress West Pakistan. On 13 December, the Soviet Union assured India the United States would not intervene militarily, while China criticized both superpowers for deploying military forces. With Indian assistance, East

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[87] C. S. Jha, "The Non-Proliferation Debate: Relevance of India's Stand," *The Times of India*, 22 February 1978, 4.

[88] G. G. Mirchandani, *India's Nuclear Dilemma* (New Delhi: Popular Book Service, 1968), 149.

[89] Indira Gandhi, "India and the World," *Foreign Affairs* 51, no. 1 (October 1972): 70-71.

[90] Perkovich, 164.

Pakistan seceded, forming the independent state of Bangladesh. Pakistan accepted an Indian-proposed unconditional cease-fire on 16 December. Indian troops withdrew on 25 March 1972. After the war, with Pakistan essentially dismembered, India was left by far the dominant power on the subcontinent.[91] Moreover, Indian perceptions of a U.S. attempt to intimidate India with nuclear weapons reinforced its motivation for an independent nuclear arms capability. In light of U.S. actions, India's 1974 test could be analyzed "as no doubt partly an effort.... [to make it] less vulnerable to such external pressures in the future."[92]

A *PEACEFUL* NUCLEAR EXPLOSION?

In May 1972, the zero-energy experimental reactor Purnima 1 went critical, marking achievement of the third and final stage of Bhabha's original plan[93] and a landmark of progress toward a nuclear weapons capability. By 1972, the BARC complex housed the Apsara, CIRUS, Zerlina, and Purnima research reactors, with 10,276 people working there as of December 1973.[94] According to early work by independent British observers Leonard Beaton and John Maddox, India had an unproven capacity to explode

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[91] Perkovich, 164-166.

[92] Spector, 65.

[93] Seshagiri, 121. Purnima 1 was decommissioned and renovated to make Purnima 2 (1984), and it was renovated to make Purnima 3 (critical 1990), see "Selected Indian Nuclear Facilities."

[94] It included 2,560 scientific; 4,486 technical; 1,333 administrative; and 1,897 general maintenance and auxiliary staff, see *India and the Bomb: Public Opinion and Nuclear Options*, eds. David Cortright and Amitabh Mattoo (Notre Dame, Indiana: University of Notre Dame Press, 1996), 128. The total was a ten-fold increase from 1959. Abraham, 61.

a device by 1964 or 1966 based on an estimated capacity to build two bombs a year from plutonium derived from the CIRUS reactor operation. Others contend India's proven bomb capability dates no earlier than its Purnima experiment in May 1972. Certainly by 1972, India had the means and the opportunity to detonate a nuclear device.

There remains much speculation on the timing of Indira Gandhi's decision to move forward with the bomb. Such a political decision and the motivations behind it were necessarily tempered by years of preparation establishing the S&T foundation. According to Perkovich,

> The nuclear scientists and their colleagues in Defense Research and Development Organization labs did much of the preparatory work without explicit political authorization as the prime minister was preoccupied by an intense political struggle and a split in the Congress Party. They had begun doing serious design studies by 1968, and in 1970 the BARC group sought to solve a weapon design problem by beginning construction of the Purnima reactor. *Explicit authorization to take the final steps and assemble a device did not come until 1972.* Thus, building the "bomb" did not entail a specific decision in time but rather a continuous accretion of [S&T] capability and political momentum, stymied occasionally by countervailing political, moral, and economic considerations.[95]

CONCLUSION

In May 1974, India detonated it first nuclear device. India described it as a *peaceful* nuclear explosion based on its definition of a nuclear weapon as a nuclear warhead actually mated to a delivery system. Anything less qualified for "peaceful" status even if it had the *potential* for weaponization. For Indians, therefore, 1974 represented progress towards visions of an economically modern India. Such judgment is

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[95] Perkovich, 146. Emphasis added.

more readily analyzed within an understanding of India's complex historical, cultural, geographic, political, economic, and moral considerations (see Table 3). For the rest of the world, 1974 marked the emergence of a potential sixth member of the nuclear club.

Pre-1947	**PRE-INDEPENDENCE** Gandhi Moral Tradition / Moral Opposition to Nuclear Weapons
1947	**INDEPENDENCE** Safeguard Independence / Overcome Poverty Modernize the Nation / Atomic Energy as Perceived Economic Panacea Political Value of Disavowing Nuclear Weapons / Maintain Nuclear Option Worldwide Symbol of Prestige / National S&T Stature Nonalignment / National Sovereignty Superpower Directed International Security
1953	**ATOMS FOR PEACE** Nonalignment / Playoff Superpowers for Economic Support Colonial Aversion / Foreign Dependency Foreign Expertise / Favorable Funding / Nuclear Scientists and Engineers Train in U.S. / Declassified Research
1954	**SUBCONTINENT MILITARISM** Conventional Military Forces Inadequacies Foreign Assistance Dependency / Seek Indigenous Capabilities U.S. Military Support of Pakistan / Military Rivalry with Pakistan
1957	**INTERNATIONAL NUCLEAR POWER SAFEGUARDS** Technology Assistance with Requisite Controls Precedent for Remaining Outside IAEA Safeguards / Address Self-sufficiency
1962	**CONFLICT WITH CHINA** Forward Presence in Disputed Regions / Regional Hegemonic Intentions? Military Rout / Reassessment of Military Capabilities Political Equity with China / Military Leverage / China Support for Pakistan Soviet MiG Negotiation / Indigenous Defense Production Capability Change of Administration / 1964 Chinese Nuclear test
1968	**NPT NEGOTIATIONS** Threat to Nuclear Option / Nuclear Powers Legitimized Nonproliferation Norm / Policy
1971	**DISMEMBERMENT OF PAKISTAN** Dominant Regional Power / Great Power Status Aspirations? Opposition Political Party Platform (Nuclear Weapons) Proving Ground for Evolving Chinese, Soviet, U.S. Relations Pakistan Mediates Kissinger and Nixon's Overtures / Trips to China PRC UNSC Seat / Legitimizing a Five Nuclear Power Security Framework
1974	**PEACEFUL NUCLEAR EXPLOSION** Freedom of Judgment and Action / Loss of S&T Aid / Economic Sanctions Political Signal / Political Expression Through Nuclear Option Pro-Bomb Lobby Counter / Consolidate Political Power? National Prestige / Short Cut to International PowerS&T Demonstration of S&T Prowess

Table 3. Key Considerations Feeding India's Nuclear Motivations

Source: Author created.

CHAPTER 4

INDIA'S NUCLEAR MOTIVATIONS

> [Concerning India's request for the United States to provide it with] all de-classified information on reactor theory, design and technology, [Bhabha stated]: In particular, we should be glad to have the detailed designs of such reactors that have been completely de-classified, together with all operational data that may have been obtained concerning them.... We have been given to understand that the big graphite reactor at Harwell [UK] has been more or less completely de-classified and that the large heavy water reactor at Chalk River, Canada has been largely de-classified.
>
> Homi Bhabha, Chairman AEC,
> Letter to U.S. Counterpart Gordon Dean, 1952[96]

India's motivations for acquiring a nuclear weapons capability are complex and deeply rooted in the national political, cultural, and economic existence. Nehru's 1945 vision of an economically developed India with all the trappings of a modern state, including nuclear energy, drove the nation to build the basic nuclear infrastructure that gave it the opportunity, with foreign assistance, to seek the bomb in the late 1950s. Interestingly, and in direct contradiction to current analysis of proliferation motives, an immediate and overwhelming danger to national security was *not* the catalyst for that decision. Yet, security concerns clearly drove a succession of later decisions to follow the path that Nehru and Dr. Bhabha set for India before their deaths in the mid-1960s. Succeeding prime ministers, senior scientists, and other officials recognized the nature

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[96] Quoted in Abraham, 79.

and severity of the nuclear threat from China after 1964, but the initial decision to create a weapons-making capability had taken place at least six years earlier *before* the initial border clashes with China. Therefore, its nuclear motivations are more complex and interconnected than those of most other members of the nuclear club and other prospective members. This chapter analyzes India's motivations in the basic economic, political, and military categories.

ECONOMIC MOTIVATIONS

Nehru's vision of India as a modern, economically developed nation provided the first and most compelling motivation for achieving a nuclear capability. India received massive infusions of foreign assistance -- ultimately "nine billion dollars in gifts, loans and surplus food"[97] from the United States between 1951 and 1970 -- to help alleviate the dire economic situation of the population, but this treated only the symptoms and did not provide a cure. Responsibility for a national economic strategy fell on Nehru as prime minister who sought to maintain economic development as well as national freedom and integrity.[98]

Arguably, the success of both interests was based to a large extent on Nehru's vision and Bhabha's implementation of their plan to modernize the nation through the application of nuclear science. Atomic power seemed the only route to modernize India, to ensure survival of the state while providing an acceptable standard of living for its

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[97] Quoted in Zafar Shah, 156.

[98] Zafar Shah, 9.

population. As Nehru noted, "the application of nuclear energy to peaceful and constructive purposes has opened limitless possibilities for human development, prosperity and overabundance."[99] At the same time, India had to remain dependent on foreign assistance for some time to come. Nehru's nonalignment policy, attempting to maintain freedom of action from a position of independent strength rather than as a proxy of one of the developed nations, served as the guiding *political* motivation. As he remarked in 1947, "Ultimately, foreign policy is the outcome of economic policy and till that time, when India has properly evolved her economic policy, her foreign policy will be rather vague."[100] Therefore, it is clear that from the beginning, economic factors predominated in national-level thinking and policymaking, with political and, ultimately, military factors subordinate to them.

At the same time that Nehru and Dr. Bhabha were emphasizing the necessity of nuclear energy as a building block for an independent India's new economy, they perceived the inherent paradox of its origins and applicability as a weapon of mass destruction. The recent memory of the devastating effects of the military atomic blasts in 1945 stood in sharp contrast with the S&T euphoria in developed nations concerning atomic power's peaceful economic potential. Bhabha, more than Nehru because of his expertise and contacts with nuclear physicists abroad, was well aware of the bomb-making potential of *any* nuclear infrastructure that India would build. Yet, he too argued the economic feasibility of nuclear power -- "atomic energy offers the only chance of

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[99] *Jawaharlal Nehru's Speeches*, vol. 1, September 1946 - May 1949 (Delhi: Ministry of Information and Broadcasting, 1949), 24-25.

[100] *Constituent Assembly of India* (*Legislative Debates*) 2, no. 5, 4 December 1947, 1260, quoted in Perkovich, 40.

raising the standard of living" in India.[101] At least by the end of January 1958, Nehru went on record concerning India's potential to turn peaceful nuclear technology into a military weapon. In response to questions about how India would react to a nuclear-armed neighbor, he declared unequivocally, "We can do it [develop nuclear weapons] in three or four years if we divert sufficient resources in that direction. But, we have given the world an assurance that we shall never do so. We shall never use our knowledge of nuclear science for purposes of war."[102] Later that year, Bhabha finalized plans for acquiring a reprocessing capability, ultimately built at Trombay, ostensibly as centerpiece of India's economic modernization but with the clear potential for producing a bomb. Thus, from virtually the beginnings of India's nuclear program, its chief political and scientific leaders recognized the weapons-making potential of their nuclear infrastructure and S&T initiatives.

A distinct subset of economic motivations can be identified in the S&T community. First, as the nuclear infrastructure began to materialize and the body of S&T personnel began to grow, they developed a constituency of supporters for maintaining and increasing India's nuclear capabilities, often independent of other national-level considerations. That is, the S&T community provided an independent set of pressures on the government to keep and enhance the nation's nuclear achievements. Second, the sheer pride of that community in those achievements reinforced their willingness to go to the next step, to seek the bomb as yet another example of the economic and industrial might of a modern India. Both Nehru and Bhabha considerably underestimated the time

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[101] Bhabha (1953 statement), quoted in Wohlstetter, 39.

[102] Mirchandani, 231.

required to establish the nuclear power program, and economic benefits were slow in coming. However, this did not diminish national S&T prestige for those achievements. The idea that nuclear power harbors special S&T prestige continues to be a key motivator.[103] Third, the achievement of economically and scientifically valuable spinoff technologies embodies another area of long-term motivations for maintaining or enhancing a nuclear weapons capability. One of India's core S&T success stories, software export, can be seen as a secondary motivator. In fact, India is emerging as the largest exporter of software and computer know-how to the United States.[104]

Another subset of economic motivators can be found in India's overall defense industrial establishment. While most of it concentrates on conventional military weapons and equipment -- enhanced by imported weapons and technologies -- its health depends to a certain extent on the vitality of the nuclear weapons program. This is especially true because of the vast array of equipment and subsystems that the nuclear establishment contracts for from the defense industry. As India continues to develop an array of delivery systems for its nuclear devices, especially ballistic missiles and certain aircraft, the defense industry plays an increasing role in the overall nuclear weapons effort. Therefore, that industry provides a somewhat independent constituency of support and

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[103] For example, US diplomats recognized in 1966 the value-laden aspects of nuclear prestige. The State Department cautioned that the term "five nuclear powers" should be avoided because it incorrectly implied that those nations possessed some "special interest or ... common power, prestige, or capability not shared by others." Department of State, Joint State/USIA/ACDA/DoD Message, subject: (no title) Guidance for U.S. Public Posture, 27 October 1966, 2; Subject-Numeric File, 1964-1966; Central Files of the Department of State, Record Group 59; National Archives Building, Washington, DC.

[104] Tony Karon, "Why India and U.S. Agree to Disagree Over Nukes," CNN, 21 Mar 2000, URL: <http://www.cnn.com/2000/ASIANOW/south/03/21/india3_21.a tm/index.html>. Accessed 1 April 2000.

motivation for nuclear weapons initiatives based on its concern for the economic health of the defense industry.

Similarly, India's space program plays a role in the overall economic motivations. Based on the examples of the United States and Soviet Union in particular, India recognized that development of an effective space launch system would enhance its ability to build an indigenous ballistic missile system. After all, those two nations first used ballistic missile platforms to launch satellites, and then further developed them into nuclear warhead carriers. As early as 1963, they established the Thumba Equatorial Rocket Launching Station, involving assistance from the United States, United Kingdom, France, West Germany, and the Soviet Union.[105] The Indian Department of Space was created in 1972, and the first experimental satellite was launched in April 1975. Dr. A. P. J. Abdul Kalam, for example, trained in the United States on its space launch program during the 1960s.[106] He later became director of the India's ballistic missile program and was the chief designer of India's first civilian SLV, responsible for its subsequent adaptation to the Agni medium-range ballistic missile.[107] As with the defense industry proper, India's space program had a large stake in the success of the nuclear weapons

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[105] The Soviet Union launched the first earth satellite, Sputnik, into orbit on 4 October 1957. The first U.S. satellite, Explorer I, was sent into orbit on 31 January 1958. President Eisenhower signed the bill creating the National Aeronautics and Space Administration (NASA) on 29 July 1958. "Main Events of the Eisenhower Presidency 1953-1961," Eisenhower Center homepage, URL: <http://history.cc.ukans.edu/heritage/abilene/ikectr.html>. Accessed 15 June 2000.

[106] William H. Webster, Director of Central Intelligence testimony in U.S. Senate, Committee on Governmental Affairs, *Nuclear and Missile Proliferation*, 18 May 1989, 101st Congress, 1st session, Senate Hearing 101-562 (Washington DC: GPO, 1990), 12.

[107] K. S. Ramamurthy, "Commentary Lists Accomplishments of Indian 'Missile Man'" (text), BK3011115397 Delhi All India Radio, 1010 GMT, 30 November 1997. *FBIS Daily Report* – South Asia, 30 November 1997, FBIS-TAC-97-334, 8.

program, and its support provided another strong *economic* motivator for continuing and enhancing weapons development.

Overall, economic factors played a critical role in India's initial efforts to nuclearize its economy and to provide the infrastructure requirements for progressing to weapons development and for proceeding to design and detonation of a nuclear device in 1974. Economic motivators served as the initial catalyst for India's weapons program.

POLITICAL MOTIVATIONS

No nation can seek to acquire a nuclear weapons capability without the political will to make the initial and follow-on decisions to do so. In some nations, political motivators are paramount. In India, economic motivators preceded political and military factors, although Nehru's original vision of a modern, economically developed nation represented simultaneously *both* an economic and a political plan for his people. And, clearly, the 1958 decision to acquire reprocessing capabilities could not have been taken solely on economic grounds since the purely economic payback of the facility could not be guaranteed given the limited uses of plutonium. Consequently, political motivators played an early, if somewhat subordinate role to economic considerations. By the late 1960s and early 1970s, political aspirations achieved a level of predominance, exceeding both economic and military because of the national impact of further progress with nuclear weapons. Moreover, as U.S. and foreign nonproliferation policies began to be implemented in the 1960s, the argument that nations such as India should devote their scarce economic resources to the welfare of the people did not carry enough weight to

convince Indian political leaders -- in the face of overriding political considerations -- to change India's course of action.[108]

One paramount political motivator for India concerned its perception that joining the nuclear club presupposed national capability to *demonstrate* its bomb-building capability. Communist China's special international recognition, its admission to the United Nations, and its eventual assumption of Taiwan's permanent UN Security Council seat in 1971 were clearly matters of political consideration in India. The mere possession of nuclear weapons seemed to be the entrée to international esteem and, more importantly for India, "Great Power" status. The desire and drive to achieve that status stands as a critical and consistent goal of all Indian leaders since independence. Even Nehru's economic vision had a Great Power component, since an economically rejuvenated India meant one ready to enter the world stage, or at a minimum the Asian stage, ready to interact as an equal with the other Great Powers. The mere *economic potential* to build the bomb was not enough. National *political* willpower to take the next step, to build *and* to detonate a nuclear device with an international audience was essential, even if maintaining a veil of ambiguity and deniability.

Survival of the state is another political motivator for India. Its independence from Britain rested on an unsure base during the late 1940s and 1950s, linked with the parallel fate of the Islamic population of Pakistan. Persistent warfare disrupted peaceful economic progress because of the diversion of resources to the military. Concurrently,

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[108] Llewellyn E. Thompson, Ambassador at Large, Department of State. Memorandum to Secretary of State and others, subject: "Indian Nuclear Weapons Capability," Washington, DC, 30 January 1965; Subject-Numeric File, 1964-1966; Central Files of the Department of State, Record Group 59; National Archives Building, Washington, DC.

Nehru's vision of India and China as Asian "sister" nations cooperating in mutual economic and social development towards a non-military Great Power status fell apart with the continuing border animosities and regional political competition. China's entry into the nuclear club in 1964 put them even more at odds, threatening the survival of India as a nation. China's bomb put India's national well-being and continued existence in jeopardy and, in many political eyes, demanded the deterrence of an Indian bomb. Thus, national survival provided yet another purely political motivation to seek a nuclear weapons capability.

Mahatma Gandhi, an icon of nonviolence and peaceful resistance, became India's representative of a singular moral approach to the world, which led directly to Nehru's initial disavowal of nuclear weapons as a proper path for India's international affairs. Contemporary critics reinforced that tradition in the early 1960s by contending that the nation could ill afford to base its national security solely on the international environment and on the bomb, without due consideration on domestic and traditional moral strength.[109] While Nehru and Dr. Bhabha successfully changed India's course from purely economic development to, first, the potential for a nuclear weapon, then to actually achieving it, the moral tradition as a *negative* motivator has remained as one of the interacting motivators that could resurface in the future. Overall, India has been guided by economic motivators toward the bomb, with a heavy layer of reinforcing and guiding political motivators, both positive and negative, since independence in the 1940s.

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[109] Perkovich, 73-76.

MILITARY MOTIVATIONS

In India, purely military motivations took last place in order of precedence in the development of its first nuclear device. It was not until the crisis of China's bomb in 1964 that military considerations achieved a significant level of importance in national nuclear planning. Nevertheless, India has had some longstanding advocates of at least potential weaponization as a military deterrent against external aggression. For example, before his accession to be Defense Minister during India's 1974 nuclear test, K. C. Pant gave a public speech in 1965 advocating the acquisition of nuclear weapons and favoring nuclear weapons for military and strategic purposes. He argued, "developing peaceful nuclear explosives was tantamount to a bomb but involved lower risk and cost."[110] Using the accepted smokescreen, he stated that the subsequent 1974 test was *not* military in nature but merely a demonstration of Indian capabilities, as Nehru said in 1958, if it chose to build a bomb. Military leaders, however, were constrained from making public comments about the nuclear program because the military was insulated from a role in the nuclear decisionmaking process in the 1950s and 1960s. Even retired General K. Sundarji, former Army Chief of Staff, who was an advocate of nuclear weapons as a deterrent, felt reluctant to declare his opinions openly even as late as 1981 when he was Commandant of the Army's College of Combat.[111] Only in retirement could he comment that he saw the use of nuclear preparedness as a bulwark against "any ill-conceived U.S.

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[110] Perkovich, 495.

[111] Perkovich, 230-231.

plan of pressuring or bullying India or the region"[112] and that "The really big secret is that India has no coherent nuclear weapon policy and worse ... does not even have an institutionalized system for analyzing and throwing up policy options in this regard."[113] Such commentary reveals the subordinate status of the military in the nuclear decisionmaking process and the minor role of purely military motivations in national nuclear policy.

Overall, purely military motivations played a small role in India's decision to go nuclear, putting India in a category separate from virtually every other proliferant nation. Military factors were consistently subordinated to political and especially economic considerations from the very beginning of the nuclear calculus beginning with Nehru's economic vision in the 1940s.

DYNAMIC INTERACTION OF MOTIVATIONS

Every nation seeking to acquire nuclear weapons capabilities experiences a mixture of motivations. Although one may predominate as the agent of catalyst -- typically a national security factor, except in India -- others appear almost simultaneously or soon after to reinforce the initial motivator. Because of the multiple milestones that every proliferant nation must confront, there are multiple decision points for proceeding.

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[112] "Former Army Chief on Aggressive Nuclear Policy" (text), Delhi Patriot (26 September 1992), 5. *FBIS Daily Report-Near East and South* Asia, 14 October 1992. FBIS-NES-92-199, 47.

[113] K. Sundarji, *Blind Men of Hindoostan Indo-Pakistani Nuclear War* (New Delhi: South Asia Books, 1993), xiv; General (Ret.) Krishnaswarmi Sundarji (1928-1999) "educated the tradition-bound Indian Army about the consequences of nuclear weapons." For comments on *Blind Men* as a historical fiction account of his experiences, see "Warrior as Scholar" Obituary, *India Today* homepage, 22 February 1999, URL: <http://www.india-today.com/itoday/22021999/obit.html>. Accessed 21 June 2000.

At each milestone, a mixture of motivations affects the decision, interacting with each other, each with its own constituency of supporters and players. In India, economic factors played a key role in the formative stages of the national nuclear effort, guided by Nehru's vision of an economically developed, nuclear-powered India. Political factors, especially India's self-image and its role in the region and the world, began to take on greater significance. Indeed, political considerations increased because of the availability of nuclear technology and assistance from the United States and other western nations under the Baruch Plan and the Atoms for Peace program in the late 1940s and 1950s. India rebelled as much against its implied subordination as a "have-not" nation seeking handouts from the "haves" as it did against Britain in its path to political independence. A truly politically independent India, already in the process of economic modernization, would significantly benefit from an independent, non-safeguarded nuclear weapons capability, even if never actually weaponized. The mere potential would reflect favorably on the nation's political status in Asia and the world. In India's case, purely military motivations came last. The border clashes with China in the early 1960s created national antagonisms that began to unravel Nehru's other vision of the two neighboring "sisters" cooperating in each other's maturation as newly independent countries. But it was China's detonation of a nuclear device in 1964 that set up the political (and subordinate military) motivations for India itself to go nuclear ten years later. Military factors played a critical role in the mid- to late 1960s and early 1970s, separated by a generation from Nehru's original economic vision but reinforcing a subsequent Nehru initiative toward nuclear independence and a nuclear weapons capability totally in isolation from an immediate external military threat.

CONCLUSION

The nuclear decision policymakers of India tacitly permitted the development of an S&T foundation for a nuclear weapon option, as it was perceived as an internationally accepted symbol of power. In addition, its nuclear weapon option became a valuable means of securing domestically important goals, albeit not without risk. India's complex history (see Table 4) included economic motivations for modernization, and multiple motivations for self-sufficiency and self-reliance through its nuclear option. Though India remains temporarily frustrated in its quest for enhanced state status by the United States and the United Nations, the study of India's motivations demands reconsideration of a traditional security framework analysis in favor of multi-motivational analysis through a bottom-up country-specific approach.

DATE	MILESTONE	MOTIVATION
1947	Bhabha Visits Canada, Supply Agreement	Econ (S&T)
1948	Atomic Energy Act	Econ (S&T)
1951	(France) Nuclear Cooperation Agreement	Econ (S&T), Pol
1952	Four-year plan to Develop Nuclear Capability	Econ, Pol
1953	Atoms for Peace	Econ (S&T), Pol
1954	Create Atomic Energy Establishment, Trombay	Econ (S&T)
1954-1958	Bhabha's Long-term Three-stage Plan	Econ (S&T)
1954	(UK) Apsara Research Reactor Negotiations	Pol, Econ (S&T)
1955-1956	(Canada) CIR Research Reactor Agreement	Pol, Econ (S&T)
1956	(U.S.) Heavy Water Contract, CIRUS	Pol
1956	Apsara Research Reactor Critical (First in Asia)	Econ (S&T), Pol
1956	Conference on IAEA Statute Safeguards	Pol, Econ (S&T)
	SHIFT IN PRIMARY MOTIVATOR	
1958	Trombay Plutonium Reprocessing Facility Plan	Mix
1960	CIRUS Reactor Critical – Dual Track Decision	Mix
1959-1962	Tibet Rebellion / PRC - India Conflict	Pol, Mil
1962	(Germany) Nangal Heavy Water Processing Plant	Econ, Pol
1963	(U.S.) Tarapur Contract, 1st IAEA Safeguards	Pol, Econ (S&T)
1964	Trombay Plutonium Reprocessing Facility Active	Mix
1964-1966	Change of Administration (Nehru, Shastri, Bhabha)	Pol, Econ (S&T)
1964	PRC Nuclear Weapon Test	Pol, Econ (S&T)
1964	Defense Planning Introduced for the First Time	Mil, Pol
1965	Pakistani Initiated Rann of Kutch Crisis, War	Mil, Pol
1968	NPT Negotiations	Pol, Econ (S&T)
1971	PRC - UN Security Council Permanent Member	Pol, Mil
1971	Bangladesh Crisis	Pol, Mil
1974	Peaceful Nuclear Explosion	Pol, Econ (S&T)

Table 4. Key Indian Nuclear Decision Milestones and Motivations

Source: Author created.

CHAPTER 5

IMPLICATIONS OF INDIA'S DECISIONS

> [Going nuclear is] scientifically feasible, politically highly desirable, strategically inescapable, and economically not only sustainable but actually advantageous.
>
> Indian Parliamentary and Scientific Committee, 17 May 1970

It is clear from this study that India has operated under a complex combination of motivations in its efforts to acquire nuclear capabilities for commercial nuclear power and then for a nuclear weapon, and that India does not fit the motivational pattern ascribed to proliferant nations. For India, economic factors preceded political and purely military ones. Since 1974, Nehru and Bhabha's decisions have continued to play a major role in Indian strategic thinking. But, because a democratic India has openly declared its nuclear status and formally embraced it as part of the coalition government policy, the likelihood of its stepping back from such an option is significantly diminished. U. S. nonproliferation and counterproliferation policy must approach India with those key factors well in consideration.

INDIA'S PROSPECTS

Despite modernization efforts and much-heralded international globalization, the character of India remains domestically troubled, complex and diffuse. It is a multicultural, multilingual, multi-caste, and multi-faith society; however, these domestic issues did not significantly interfere with nuclear weapons development although burgeoning domestic issues are likely to figure more heavily in future political and security considerations. They will play heavily on India's self-image, its perception of security, articulation of its national interests, and domestic and foreign policy.

The evolution of nuclear and information technology on the subcontinent is likely to be more internationally influential than merely a domestic panacea. Domestic improvements, tempered by modest advances in countrywide communications and restricted infrastructure development, are compounded by India's high illiteracy rate. These realities significantly limit the input of India's population in its government's decisions but have the potential to erode public support for the legitimacy of state policies. In addition, such insulated political manipulation of nuclear processes tends to diminish the role of India's conventional military in national security. The military continues in its historical exclusion from the nuclear decision process.

In light of the extensive efforts directed against countries like Iraq, Iran, and North Korea, the question is not how many states support such efforts, but what those collective states are willing and able to do about the few states that oppose or circumvent nonproliferation. This has direct implications for India. The vast difficulties that the United States and its allies have had in dismantling Iraq's nuclear weapons program does

not bode well for similar counterproliferation efforts against other newly emergent nuclear states. Such preventative diplomacy approach is not always successful, and is in some cases disadvantageous to everyone involved.

India's perception of U.S. policy is that it is an attempt to persuade both India to voluntarily give up nuclear weapons. Some international policy analysts now criticize the premise. Richard Haass, of the Brookings Institute, contends, "These countries are not about to get out of the nuclear business. The idea of roll-back, the idea of turning back the clock – choose your image – is not on."[114]

Motivations Leverage and the 1998 Nuclear Tests

On 6 June 1998, the United Nations contended that the international regime on the non-proliferation of nuclear weapons should be maintained and that neither India nor Pakistan would be accorded the *status* of nuclear powers under the terms of the NPT. The UN condemned the tests, calling "upon India and Pakistan immediately to stop their nuclear weapon development programs, to refrain from weaponization or from the deployment of nuclear weapons ... [and] to cease development of ballistic missiles capable of delivering nuclear weapons and any further production of fissile material for nuclear weapons."[115] As for the UN enforcement capabilities, neither country complied. However, France did recognize India as a nuclear power.

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[114] "Scientists Warn of Advancements in Pakistani Nuclear Program," CNN, 16 March 2000, URL: <http://www.cnn.com/2000/ASIANOW/south/03/15/pakistan.nukes.01/>. Accessed 1 April 2000.

[115] United Nations Security Council. Resolution 1172 (1998), 6 June 1998. URL: <http://www.un.org/Docs/scres/1998/scres1172.htm>. Accessed 1 July 2000.

Indian and U.S. relations remain historically troubled. Early tensions are often associated with historical U.S. support and development of a militarized Pakistan, and India's association with Russia during the Cold War. India's insistence on open declaration of nuclear status also runs contrary to U.S. nonproliferation policy. Still, India's complaints on China's support for the Pakistani nuclear program have met with comparatively little U.S. condemnation, much to India's dismay and anger. Indeed, there is a considerable push to engage communist China economically. Overall, Indian and U.S. relations remain the result of dissimilar national interests. India, a nonaligned but not neutral nation, sets its policy through its own political decisions and priorities. Whatever India's perceived place in the world is and how India chooses to attain it, has typically met with only U.S. disinterest or disdain. Broader historical and geographic perspectives and priorities in the international system and order (national interests) have historically taken precedence over Indian and subcontinent issues.

India's potential to change necessarily requires outside the bureaucracy thought and assistance as envisioned in its stalled National Security Council. Its place in the international hierarchy is tempered by its penchant for independence of action and much publicized corrosive enmity with Pakistan. While the Kashmir conflict, simmering since 1947, remains a hurdle in diplomatic relations between India and Pakistan, it is more a political issue rather than solely a military one.

STABILITY IN SOUTH ASIA

India recognizes China as a likely permanent preoccupation. At present, Pakistan receives nuclear support from China, brokered as an instrument of its foreign policy, and China counter-balances the effect of Soviet support to India. Still, closer economic and political relations between the two Asian giants, India and China, are not unthinkable. India remains too embroiled over Pakistan's role in the Kashmir frontier issue to seek direct resolution with Pakistan. Potentially, China's nuclear supply influence could serve to moderate Pakistan on its military support to the Kashmir crisis or joint economic interests could bring India and China closer. As a current alternative, India has made recent progress in establishing a cease-fire with at least one of the independent factions in the Kashmir fighting.[116]

But, India's world standing is not solely a matter of confrontation or cooperation with China or Pakistan. India's long drive for self-sufficiency and pretense at self-reliance, as well as its nuclear option and subsequent nuclear weapons program, is a result of intentional international collaboration. India's position in the international hierarchy will likely be determined in the same manner. Yet, India remains intent on achieving its goals with nuclear weapons, despite the French, British, and Soviet examples of diminished world power in spite of nuclear weapons.

In that light, first and foremost India seeks to be a respected player not only in its own subcontinent region but also internationally in matters affecting the region. India's

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[116] "India Blames Pakistan for Killings," *The New York Times*, 6 August 2000, *The New York Times* homepage, URL: <http://www.nytimes.com/aponline/i/AP-India-Kashmir.html>. Accessed 6 August 2000.

early domestic issues, namely economic and military limitations, dominated its early efforts at self-sufficiency. India sought domestic influence over its own destiny, with much foreign financial and material assistance, and then sought deterrence over outside influences affecting its freedom of action.

India saw nuclear power as a radical solution for alleviating abject poverty, and after independence it embarked on a risky international collaboration program for electricity production through then largely unproven nuclear reactor technology. The risks of such a program included an inherent nuclear weapons option seen even then as the ultimate S&T symbol of power. Certainly, even today India remains only a potential international influence in spite of its nuclear weapons, active space program, and growing software industry all a result of international collaboration.

International Collaboration

India's nuclear option, as well as any standing in the international hierarchy, is a result of international collaboration. Collaboration between India and the United States is often frustrated by nuclear weapons *policy* differences steeped in democratic ideals rhetoric. Any argument over a higher moral plane of one democracy over another, or actions deemed outside the notional *international community*, remains largely counterproductive for two reasons. One, the geographically isolated and uniquely blessed United States is likely an atypical ideal to hold any nation to. Secondly, India's pragmatic use of its available resources, although arguably a matter of hastily drawn priorities, best addresses its own democratic national interests. Herein lies the crux of the debate. *Policy*, defined by political choices and influenced by the dynamic interaction of

motivations drives nuclear weapons, not numbers, legitimacy, or consensus. In effect, the key to addressing such proliferation issues is through the decision-makers (or regimes) and their intentions, not solely by restricting capabilities.

The lesson learned is that in spite of its much-touted sole superpower status, the United States remains both unwilling and unable to effectively address the entire spectrum of world conflict or to contain nuclear proliferation alone. If the United States is to maintain its leadership and any effectiveness in nonproliferation efforts, it must deliberately and tirelessly affect a working relationship with any or all nations involved in the process. The U.S. insistence on its role as the representative for the notional *international community* will continue to ring hollow until all countries are equally consulted in the process. Of course, as seen in the United Nations, it will be no easy matter.

Conflict Resolution

Indeed, in its ironic capacity as the largest arms broker and the most vocal proponent of conflict resolution, the United States exhibits its own chronic reliance on ambiguity as a political tool. Who has the latest technology is probably the wrong question to ask. It is not a technology revolution that threatens international order but the novel application of concepts. For example, the nuclear powers remain vulnerable to most of the same domestic pressures as emerging nations. However, the developed nations, *entrenched in their well known conventional strengths*, are increasingly subject to asymmetric threats. Despite much-heralded victories, the War to End All Wars, World War II, the Cold War, and the Gulf War did not mark an end to conflict. Certainly,

motivations to acquire technological weapons of prestige, and nuclear proliferation remain potent forces. In practice, because of demonstrated conventional superiority, countries now look to asymmetric weapons to counter dominant actors' conventional superiority.

Indeed, the term security itself remains relatively obscure and certainly outside the realm and influence of military forces alone. Pakistan's support and involvement in the Kashmir secessionist movement and border conflict is likely the largest factor contributing to the border instability with India. Indeed, while India argues that conflict resolution is a bilateral concern, with no role for the United States, it continues to make efforts to address individual factions and negotiate individual cease-fires. This is in part due to the fact that no effective international or UN mechanism for conflict resolution was or is currently available.

The Momentum of Technology

This study highlights the issue of the momentum of technology reflected in nuclear proliferation. India, benefiting by extensive international collaboration, established a nuclear weapons foundation that served to question and then challenge the beleaguered nuclear *status quo* established and extended by the NPT. The precedent it set in 1974 involved a historically persistent S&T industry, with the tacit approval of the Prime Minister. It unsuccessfully sought a shortcut to its rise to Great Power status. Such early projected economic development through a commercial power program involved a likely inevitable nuclear weapons program that was considerably enhanced (even advocated) by parallel international advances in technology.

In retrospect, the inevitable and much desired momentum of nuclear weapons development was evident from their first use. *The New York Times*, 7 August 1945, reported the dropping of the first military atomic weapon over Hiroshima. According to President Truman, "In their present form these bombs are now in production ... and even more powerful forms are in development.... What has been done is the greatest achievement of organized science in history."[117]

In light of India's 1974 *experiment*, the 1998 tests could be analyzed as a logical, albeit delayed, consequence of the momentum of technology. India's motivations to continue to use that momentum to achieve its own economic goals are more instructive than solely a summary of its nuclear capabilities. Given India's considerable difficulties and inefficiencies with nuclear power production, its overall nuclear power and weapons programs could arguably be viewed as less than an economic or technological success. According to Anumukti, an Indian anti-nuclear journal, India's proclaimed S&T nuclear prowess is arguable at best. The 1998 nuclear tests "actually shows the level of scientific [illiteracy] in the country that it takes such pride in an achievement of repeating an experiment first done five decades ago elsewhere."[118]

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[117] "First Atomic Bomb Dropped on Japan; Missile is Equal to 20,000 Tons of TNT; Truman Warns Foe of 'Rain of Ruin'," *The New York Times*, 7 August 1945, Late City Edition, 1.

[118] Anumukti (Liberation from the Atom) homepage, URL: <http://members.tripod.com/~no_nukes_sa/anumukti.html>. Accessed 2 July 2000. The journal was established in 1987.

CONCLUSION

India's dynamic interaction of motivations, including the economic motivations for the modernization of the nation and for acquiring its nuclear weapons option, is a significant study. The complex interrelationship of economic, political, cultural, moral, S&T, and military considerations led India out of colonial independence through its production and testing of a peaceful nuclear device in 1974. While both events are often identified as seminal happenings in India's history, such analysis does not capture the decades-old essence of India challenging the nuclear *status quo* established and maintained by the original members of the nuclear club. The many different communities of interest -- political officials, S&T and defense industries leaders, and military officers -- each with its own constituency of supporters, has created a dynamic interaction of motivations that remains unique to India.

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